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Cognitive Strategy Assessment and Intervention with Educable Mentally Handicapped Adolescents

by

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A THESIS

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Dedication

To the students who first taught me and constantly demonstrate that the potential we fear to be impossible is really possible; to my mother and father who gave me the strategies and skills to grow and learn, and for their continuing love, support, tolerance and efforts; and, to my wife for her constant tolerance, understanding, colleagial support, love and friendship.

Abstract

Given the lack of research into the reading comprehension strategies of educable mentally handicapped adolescents (Terry and Pakes, 1985), the inherent difficulties in assessing strategies (Afflerback and Johnson, 1984; Ericson and Simon, 1980), and the lack of careful research on actual applications of cognitive interventions (Cavanaugh and Perlmutter, 1982; Sternberg, 1983), this exploratory study investigated existing strategies utilized by fifteen educable mentally handicapped adolescents in a reading comprehension task. Other factors examined included locus of control and teacher perception of student problem solving behavior. As well, the impact of two brief also was investigated; a learner strategies model developed by the author and based on the work of Vygotsky 1962; Piaget, 1972; Feuerstein, 1980; and Brown 1978; and a self instructional training model (Meichenbaum, 1977).

A final purpose of the study was to investigate which of four reading strategy assessment devices would be most useful in assessing the strategic behavior of educable mentally handicapped adolescents in a reading activity. The four devices included introspective passages (Olshavisky, 1977 and Christopherson, Schultz and Waren, 1981), scrambled sentences (Yussen, 1982), cloze passages (Tierney and Cunningham, 1980; Taylor, 1953 and Jenkinson, 1957), and main idea unit selection (Brown and Smiley, 1977). All sessions were audio taped.

The results indicated that educable mentally handicapped adolescents functioning at the fourth to fifth grade level in reading did possess a variety of strategies in reading comprehension. In fact, twenty-five different strategies were found. As well, five of the students monitored their reading and the application of strategies to a reading task. These findings supplement the work of Ashman (1984), Brown (1978) and Michael, Cohen, Meyers and Schlesser (1982).

Strategy use was not consistently effective or appropriate. For example, only one student attempted to verify a spontaneously generated hypothesis. However, it was found that the use of reading strategies by educable mentally handicapped adolescents was receptive to improvement, particularly in the learner strategies group. Students in the learner strategies group achieved significantly better than did their peers on the cloze passages, became more accepting of self responsibility for their academic achievement, and were perceived by their language arts teachers to use more strategic planning in their classroom work. Within the limitations of the study, results in support of the learner strategies model strengthen the confidence in the findings of the other researchers such as Collins (1977) and Anderson (1977) who placed an emphasis on the learner through a Socratic dialogue.

The results indicated that of four types of reading strategy assessment devices, the cloze procedure yielded a range of strategies across all students. Use of the cloze passages appeared sufficient to obtain a rich variety of information on the reading strategies utilized by educable mentally handicapped adolescents. Most students were unable to complete the selection of idea units in the Brown and Smiley (1977) passages.

While the fifteen students formed a cohesive group on traditional measures such as intelligence and reading level, the use of strategic planning behavior as measured by the four reading strategy assessment devices differentiated the group. This finding of heterogenity supports conceptualizations held by Hallahan and Kaufman (1976) who argued that the mentally handicapped, like the learning disabled, are not consistently low across all areas.

Implications of these findings regarding the impact of short term learner strategy intervention and the methodological findings regarding the use of verbal data with the educable mentally handicapped were presented.

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I. INTRODUCTION

A. Rationale

Few, if any, studies have addressed the reading skills and strategies utilized by educable mentally handicapped adolescents in comprehending a reading passage (Terry and Pakes, 1985). In applied educational settings, this finding from the research literature is supported by the paucity of techniques and materials to support reading instruction for the educable mentally handicapped. Indeed, many school personnel who attempt to respond to the needs of the educable mentally handicapped adolescent and young adult focus their instructional energy on functional life skills -- including survival words and rote completion of government and job-oriented forms such as those required for unemployment benefits and a driver's licence. Examples of this emphasis can be found in government and school jurisdictional guides such as those supplied by Alberta Education and the Newfoundland Department of Education.

While it is important to recognize and address the life skill needs of all students, it appears equally important to attempt to continue to address other needs of students, specifically those strategies necessary for reading comprehension. As noted by Feuerstein (1979), the use of the label educable mentally handicapped appears to orient the teacher, particularly at the secondary level, toward concrete modes of transmission, problem presentation and response management. Limited use is made of higher levels of thought processes, symbols or abstract levels of communication. Feuerstein went on to state that the concrete modalities of instruction and the task analytic approach to functional skills is, for the student who wears the label educable mentally handicapped, a central link in the vicious circle of perpetuating delayed performance.

Samuels, Roadhouse, Conte and Zirk (1984) noted that the disappointing results from remedial programs for students with learning problems has encouraged educators to look for new approaches to intervention. A shift in emphasis away from content or product oriented approaches to cognitive or process oriented approaches that stress strategies for thinking and learning is now advocated (Waksman, 1982). These process oriented approaches have come to be known as cognitive education, intellectual skills training programs and strategy training programs.

Despite the change in emphasis in instructional technique from product to both process and product, research methodology has continued to utilize product oriented measures to determine the effectiveness of interventions. Examples of research that have utilized global product oriented measures include Narrol, Silverman and Waksman (1982), Samuels, Roadhouse, Conte and Zirk (1984) and Haywood, Arbitman-Smith, Bransford, Delclos, Towery, Hannel and Hannel (1982). While some of these experiments have found non significant results, this lack of significance may be an artifact of the type of measure rather than the lack of an effect of the intervention.

A requisite to evaluating cognitive education would appear to be a determination of the facility of various types of exceptional learners to utilize such cognitive training procedures. Research of the type conducted by Narrol et.al. (1982) and Samuels et.al. (1984) has imposed a methodology without first determining the nature of existing strategies, or the interest and capacity of the student to utilize highly verbal techniques. Thus, conclusions drawn about the merits or lack of merits of cognitive education may be inadequate in that the conclusions were based on incomplete information. It would seem that the real merit in cognitive education and in having teachers address "process" in addition to "product" oriented education rests with examining existing strategies and, where necessary and possible, facilitating improvement in those strategies. While initial research by Rand, Tannenbaum and Feuerstein (1979) indicated such was possible, particularly with culturally deprived and so-called normal learners, we have little information available on those labelled educable mentally handicapped.

Requisite to a determination of the ability of exceptional learners to utilize much less benefit from, cognitive/strategy training is a more precise means of assessing strategies such as those utilized in a reading comprehension task. That is, a ways and means of tapping "metacognitive" monitoring of a reading comprehension task with an exceptional population has yet to be refined and verified. In addition, some methodological information concerning the facility of exceptional learners to utilize the paradigms involved to cognitive education would appear beneficial in the further development and evaluation of process oriented procedures.

B. Purpose

Specifically, this study has been designed as an intensive exploratory venture to gain further information on five major issues.

1. The nature of the assessment techniques necessary to assess the existance of reading comprehension strategies in educable mentally handicapped adolescents.
2. The nature of strategies utilized by educable mentally handicapped adolescents in a reading comprehension task.
3. The nature of teacher perceptions of academic problem solving strategies used by educable mentally handicapped adolescents as well as the students' level of self acceptance of responsibility for global world outcomes and academic achievement.
4. The nature of student self acceptance of responsibility for outcomes.
5. The impact of short-term intervention utilizing the Self-Instructional Model (SIT) or the Learner Strategies Enabling Thinking Model (LSET) on the existing reading

comprehension strategies of educable mentally handicapped adolescents, their perceived locus of control, and teacher perceptions of the academic problem solving behavior of the educable mentally handicapped adolescent.

C. Definition of Terms

For the purposes of this study:

1. Educable mentally handicapped (EMH) were specified as those students having an intelligence quotient in the range of 60 - 70 on the Wechsler Scale Intelligence Scale for Children - Revised. In addition, a flat profile and consistent verbal/performance score was required. Consistent for the purposes of this study was defined as having a verbal performance IQ spread of 10 or less points to ensure greater homogenity. As well, these students should have no outstanding physical, sensory, behavioral, language or cultural deficits that may interfere with the progress of the study.

2. Adolescents were specified as those individuals within the age range of 16 years to 19 years of age, still in school and not working full time.

3. Strategy was defined as those techniques, principles or rules that will facilitate the acquisition, manipulation, integration, storage and retrieval of information across situations and settings (Deshler and Alley, 1979).

4. Metacognition was defined as one's knowledge concerning one's own processes and products or anything related to them (Flavell, 1977).

5. Comprehension monitoring was defined as the process of keeping track of one's ongoing comprehension success ensuring the process continues effectively and taking remedial steps where necessary (Baker and Brown, 1980).

D. Research Questions

1. What strategies and/or patterns of strategies were utilized in reading comprehension by adolescents labelled educable mentally handicapped and functioning in the grade 4 through 6 reading level?
2. What reading assessment instruments provided information regarding the strategies utilized in reading by educable mentally handicapped adolescents?
3. Did the limited exposure to the three intervention conditions (control, LSET, SIT) affect strategy utilization and reading comprehension by EMH adolescents?
4. a. What was the locus of control of EMH adolescents?
   b. Did limited exposure to the three intervention conditions (control, LSET, SIT) affect locus of control as perceived by EMH adolescents?
5. a. What perceptions of problem solving strategies were held by teachers of EMH adolescents?
   b. Did limited exposure to the three intervention conditions (control, LSET, SIT) affect teacher perceptions of problem solving strategies?

E. Significance

The significance of this exploratory study rests with the generation of information concerning the measurement and nature of reading comprehension strategies used by educable mentally handicapped adolescents. Few if any studies have been noted that address such a process with the mentally handicapped. From a methodological perspective, in depth individual participant information relative to a ways and means study of utilizing SIT and LSET by educable mentally handicapped adolescent students will be generated. Furthermore, some initial information on the short term impact of such training on existing participant strategies will be available. This initial information will assist in the development of more detailed long term and group type studies.

Another potential significance may accrue to the participant. Previous research by Ross, Ross and Downing (1973) has suggested that students lacking skill in everyday problem solving and planning tend toward passive avoidance when confronted with situational problems. However, skill in problem solving contributes to a sense of competence which in turn may influence the individual's willingness to recognize problems and respond to them. Hence, strategy training may improve individual student ability to more appropriately respond to problem situations.

II. REVIEW OF RELATED LITERATURE

A. Introduction

Recently researchers have learned that while applications of cognitive training to the classroom setting have yielded promising results, the lack of careful research on actual applications is cause for caution in teacher use of such approaches (Gerber, 1983; Kendal and Mason, 1982; and Cavanagh and Perlmutter, 1982). Sternberg (1983) in calling for long term research on cognitive training stated that many interventions which have shown great promise on first introduction have come to be viewed with justifiable dismay. Referring to cognitive training programs, Sternberg (1983) went on to state that while such programs may do considerable good, they also may do considerable harm.

Given these reasons for caution, it is important to question whether researchers have the methodology to determine the true impact of intellectual skills training programs on individual students. For example, recent studies on the impact of Instrumental Enrichment on students have examined group measures of intelligence, locus of control, academic achievement and behavior (Samuels et al, 1984 and Narrol et al, 1982). While examination of the results obtained on these group measures may provide information on general or global trends, little is known of the impact on individual students, since global measures may mask the impact or they may lack the sensitivity to determine such an impact.

In the attempt to prove acquisition, maintenance and transfer of generic problem solving strategies, researchers may be learning more about "what" students learn (products/outcomes/contents) such as achievement scores; associated factors in learning such as locus of control, self concept and attitudes; but, little of "how" students learn. The "how" a student learns, concerns the use of strategies to regulate informational processing (Kirby, 1984). Schumaker, Deschler, Alley and Warner (1983) and Sheinker, Sheinker and Stevens (1983) have argued a similiar point in referring to the importance of both process (how) and product (what) oriented teaching in secondary school situations.

The interest in learning more about how students regulate the processing of information requires, as Kirby (1984) stated, that researchers bridge the gap that appears to exist between cognitive theory and educational applications. One educational application of cognitive theory and the regulation of information processing is reading.

As in cognitive training programs, understanding of the processes involved is reading as advocated by Thorndike (1917) and Simons (1971) has been based on inferences on differential performance on different reading comprehension questions (Afflerback and Johnston, 1984). However, recent studies of the cognitive processes involved in reading have used verbal reporting techniques such as introspection to gather data (Bridge and Winograd, 1982; Brown and Day, 1983; Olshavsky, 1976-77; Kavale and Schreiner, 1979; and Lupart, 1984).

Use of the methodology found in recent reading research to examine cognitive training programs may provide additional and individual specific information on the nature of strategies used by students to regulate information processing, specifically those strategies that are used to regulate information processing in reading. This would contribute to bridging the gap noted by Kirby (1984) between cognitive theory and educational applications. As well, this research would contribute to expanding an information base on the educable mentally handicapped in reading.

B. Cognition: A Conceptual Framework

As noted by Kirby (1984) confusion exists over the nature of cognitive processes and strategies.

The distinction drawn for the purposes of this study as supported by Kirby (1984), is that processing refers to the cognitive functions involved in the actual encoding, transferring, storing and retrieval of information. Those functions responsible for controlling or planning these processes are called strategies. Other labels such as performance components and metacomponents (Sternberg, 1980) do exist and introduce blurring of any solid distinction between processes and strategies. According to Kirby (1984), the basic problem that appears to exist is that strategies have process aspects and vice versa. Furthermore, once the cognitive system begins to perform a realistic task, the distinction between a process and a strategy becomes harder to operationalize.

In effect, this difficulty separating processes from strategies exists more as the result of the difficulty differentiating cognition from metacognition. Cognition has been defined as "any activity of becoming or being aware of something or having an object of consciousness" (Schmidt, 1973, p. 106). This notion of cognition is a broad all inclusive one which covers more than the traditional narrow intellectual processes such as problem-solving, and extends to include affective or emotional awareness. Flavell (1977) has a similiar notion of cognition. He stated that cognitive processes habitually intrude themselves into virtually every human psychological process and activity. Piaget's assimilation-accommodation model also provides for and describes how the cognitive system interacts with its environment and is changed by such interactions (Piaget, 1970). While Flavell (1977) stated that the individual plays a very active role in cognitive environmental interchanges, Brown (1980) has stated that younger students and those who are mentally handicapped are more passive in their approach to tasks, thereby failing to spontaneously produce strategies.

According to Flavell (1976, 1977) this active role on the part of the individual involves two aspects. One aspect involves being a participator in a cognitive event. The second aspect involves being an observer or monitor of that cognitive event. The resulting active monitoring and consequent regulation and arrangement of the processes involved in a cognitive event Flavell came to call metacognition. Specifically, Flavell (1976) stated that metacognition included "the active monitoring and consequent regulation and orchestration or these (cognitive) processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective" (p. 232).

While the term metacognition is a relatively new term, the concept of monitoring and regulating the processing of information has been with us for some time as observed by Brown (1981), who quoted the work of Dewey (1910) and Huey (1908). Despite the widespread use of the term, a lack of consistency in the use of operational definitions and theoretical constructs exists (Lawson, 1984 and Forrest-Pressley and Waller, 1984). For example Sternberg (1983) includes metacognitive components in his theory of intelligence referring to "executive skills" as those skills used in planning, monitoring and revising strategies for task performance. He listed nine executive processes which also may be termed metacognitive processes. These executive processes included problem identification, process selection, strategy selection, representation or mode of presentation, selection, allocation of resources, solution monitoring, feedback sensitivity, translation of feedback into an action plan, and implementation of the action plan. Nonexecutive processes were defined as those processes used in actually carrying out the task. These included selective encoding, selective combination, inference, mapping, application, comparison and justification. While there might be some argument over whether all of these are truly nonexecutive functions, it appears that these nonexecutive processes approach what it typically referred to as cognitive processes.

Earlier, Brown (1978) stated that the skills of metacognition are those attributed to the executive in many theories of human memory and machine intelligence; predicting, monitoring, reality testing as well as the coordination and control of deliberate attempts to study, learn or solve problems. Even earlier, Cazden (1972) wrote of metalinguistic awareness using the term meta to refer to a reflective awareness of cognitive processes.

It would appear that when Flavell (1976) incorporated the notion of control of cognition in his definition of metacognition, he was following the lead of many others involved in the study of cognition. However, these others, such as Butterfield, Wambold and Belmont (1973) who were conducting research in the area of mental retardation, wrote of executive processes being necessary to control cognition.

These executive processes could affect the acquisition, maintenance and generalization of problem solving strategies in the mentally retarded.

More recently, Cavanaugh and Perlmutter (1982) argued that only the contents of memory knowledge should be termed "meta." While memory knowledge can be derived from the use of executive processes and can contribute to the effectiveness of memory, the memory processes should be distinguished from "metamemory." In other words, Cavanaugh and Perlmutter saw cognitive processes as composed of metacognitive knowledge, knowledge of cognitive processing, and executive processes.

Much earlier, Vygotsky (1962) described two phases in the development of knowledge. The first phase was the automatic unconscious acquisition of knowledge which was followed by gradual increases in active conscious control over that knowledge. It may be that this is essentially the difference between what has been termed cognition and metacognition. That is, the metacognitive components of monitoring and regulating are similar to the gradual increases in active conscious control over knowledge. The unconscious acquisition of knowledge and the knowledge itself is cognition. Indeed, Brown (1980) has made a similar statement concerning the distinction between cognition and metacognition.

In order to rationalize the distinction between cognition and metacognition with the earlier definition of cognition as provided by Schmidt (1973), it is important to note that it would appear that Schmidt's notion of cognition entailed a continuum of development involving the individual in moving from "reacting to" to "knowing about." As such, the metacognitive component would appear to come at the "knowing about" end of the continuum. It might be argued however, that the "knowing about" in Schmidt's notion of cognition is really the executive or metacognitive component referred to by Brown, Flavell, Sternberg and Cavanaugh and Perlmutter. As an example, metacognition is the ability to distance oneself in an emotional encounter such that one does not simply react to stimuli but is able to stand outside the situation and view it as a relatively impartial observer. Impartiality is used as a relative term since one is never fully able to view or participate in any encounter without being altered in some small way by that encouunter. And so, using the concepts of "reacting to" and "knowing about" referred to in Schmidt's definition of cognition and despite claims to the contrary by Cavanaugh and Perlmutter, it may be that the notion of metacognition is really not separate from cognition but at one end of the continuum of cognitive experience/development within a dynamic and broad definition of cognition.

The issue of conscious control referred to earlier by Vygotsky raises another interesting aspect in the continuing debate over cognition and metacognition. Lawson (1984) stated that knowledge about metacognition has been limited to conscious reportable knowledge described by Brown (1981) as "stable, statable, fallible, and late developing" (p. 211). Yet, not all executive processes will be consciously controlled processes. As Kirby (1984) stated a distincition should be drawn between established automatized strategies and the "to-be-constructed" strategies that are not yet automatized. These "to-be-constructed" strategies are most open to conscious control and reporting. Those strategies which have become automatized may not be open to conscious control and may not readily be reported (Shiffrin and Deumais, 1981). Simon and Simon (1978) and Fredericksen (1980) stated that skilled or expert performers may show little evidence of executive processing simply because of their level of expertise. Less skilled or novice performers may show a greater frequency of planning, analysis, monitoring, evaluating and modifying.

Brown (1978) stated that the concept of knowing about knowing cannot be separated from the concept of knowledge itself. To know X+Y=Z is one piece of knowledge. To know the conditions under which to apply the addition rule is another piece of knowledge. An increase in either is really an increase in understanding about X, Y and Z. Klahr (1974) has made a similar point in discussing the question of whether or not we should consider two forms of knowledge. One form was knowledge of the thing itself while the second form was knowledge of its appropriate use. As Brown (1978) has noted, this type of reasoning illustrates the interdependence of the metas with their content area.

Forrest-Pressley and Waller (1984) have argued that perhaps the interdependence of "meta" with a content area and with cognitive processing is a large part of the reason for the lack of research successful in defining the role of "meta" in an academic content area such as reading, and in defining the relationship between the cognitive and metacognitive aspects of reading.

It appears that a more efficient, effective and ecologically valid approach in terms of educationally assisting handicapped learners might be to pursue the study of student strategies in academic content areas, and to study the effect of those strategies on the regulation of cognitive processing functions including encoding, transforming, storing and retrieving information. In other words, acceptance of a definition of cognition such as proposed by Schmidt (1973) may be more expedient and ecologically valid. Such a defifnition accounts for individuals "reacting to" situations which may result from passivity or automatized unconscious responses. As well, the definition accounts for the "knowing about" or the conscious knowledge and control component which some term "meta" and others term "executive processing."

Implications of Current Conceptions of Cognition for Educators. While the concept and rationale of what is now termed meta may not be new having been the subject of discussions by Socrates and studies by Wundt and his followers (Humprey, 1951), its focus is an important one. For example, Broudy (1977) stated that the distinction between knowing what and knowing how is a viable distinction with important implications for the educational setting.

Knowledge of exploratory problem-solving strategies and subsequent intervention to improve student performance based on these techniques appears to be a worthwhile endeavour (Sheinker, Sheinker and Stevens, 1984 and Wong, 1985). Another potential value of this renewed focus of knowing about knowing or meta lies in the interdependence between memory per se as one example, and the knowledge of memory strategies. Such an interdependence is hypothesized to lead to processing strategies which may be transferred to other forms of problem solving, although this generally has not been found to be the case (Schumaker, Deshler, Alley and Warner, 1983). While Brown (1978) referred to this relationship as incestuous, she supported the notion that skills currently studied under metacognition are trans-situational. This trans-situational notion leads to an even greater potential forthe current focus on monitoring and regulation of information processing strategies, that of ecological validity. Such a focus moves research from the study of isolated memory of nonsense syllables as one example, to providing subjects/people with strategies to check their effectiveness and efficiency in any problem solving task.

Flavell (cited in Brown, 1978) has argued that the isolation, however artificial, of metacognition for study will help researchers to focus on similarities as opposed to differences in traditional cognitive domains. Brown (1978) went on to note that metacognition demands the ability to introspect about one's own performance. In addition, metacognition demands a differentiation of one's own perspective from that of others. Such a demand amounts to self-evaluation of one's own performance which by definition cannot be objective and becomes intertwined with self concept, personal development, growth of personality, social interactions, one's capacity and motivational states. Therefore, the study of cognition and otherwise previously held unrelated areas of study become relevant and related. All of these activities related to meta can be fitted into the "knowing about" continuum referenced in Schmidt's concept of cognition.

Brown (1978) also noted the necessity of weakening boundaries between traditional cognitive domains. Indeed, it would appear that not only are traditional cognitive boundaries being weakened, but also, traditional cognitive/behaviorists boundaries may become less entrenched. Examples of such a weakening are evident in the work of Bandura (1977) and Meichenbaum (1974) who utilized the work of Luria, Vygotsky and Piaget. Brown (1978) stated in reference to the realigning of cognitive boundaries that such a realignment cannot be anything but helpful to the developing child as a whole person rather than as the repository of fragmentary skills in various developmental stages. Furthermore, the potential linking of behavioral and cognitive intervention processes as in the work of Meichenbaum (1974) cannot help but foster, at the minimum, invigorating attempts to alter those with less than adequate social, problem solving, memory, and reading strategies. Sarason and Sarason (1981) also made the following point, which offers real hope for intervention with the mentally retarded. They stated that a varied literature in both problem solving and role taking strategies suggests that cognitive and social skills are associated with adjustment and may not be highly related to intellectual ability.

Implications of Current Conceptions of Cognition for the Educable Mentally Handicapped. While there have been many positive changes in attitudes and approaches toward mentally handicapped people, much remains to be achieved, particularly in academic training programs (Ashman, 1984). Some of the major limitations facing the mentally handicapped in improving learning performance according to Ashman (1984) include:

1. an inability to spontaneously generate problem solving strategies;
2. an inability to generalize learning from one situation to another;
3. an inability to evaluate the success of strategies in use.

Summarizing recent research on mentally handicapoped persons with regard to deficits in strategy selection and verification, Ashman (1984) concluded:

1. While mentally handicapped persons may not have sufficient information for successful task completion and may not be able to access appropriate strategies spontaneously, they are able to use coding strategies.
2. Mentally handicapped persons can learn to select strategies in accordance with the task demands and may in certain circumstances transfer use of these strategies to other tasks.
3. Mentally handicapped persons appear to have limited awareness of their information processing capabilities.
4. Mentally handicapped persons appear to lack an efficient hypothesis testing approach to problems and appear to fail to monitor their performance.

Given this brief summary of some of the conceptions of cognitive functioning by mentally handicapped persons, it appears that educable mentally handicapped students may not be aware of or effectively use strategies to monitor and regulate their information processing. In this regard, it is important to explore how teachers, other adults, or the student may intervene to assist in monitoring and regulating information processing. But first, it is necessary to consider the role of language in monitoring and the deployment of strategies.

Luria (1961) argued that mentally handicapped children are characterized by an inertness in the verbal system. Extensions of his research have found that mentally handicapped children frequently fail to focus attention on reliant features of a stimulus due in part to a lack of verbal encoding and labelling (O'Connor and Hermelin, 1963). Dewart (1979) claimed that mentally handicapped students tend to rely on semantic expectations in sentences with little or no mastery of the syntactic aspects of language. Therefore, it would appear that an adult mediatior is required to assist the educable mentally handicapped student.

Language and thought are held to be related with some linguists arguing that language patterns control thought patterns (Smith, Goodman and Meredith, 1976). While two different views of the influence of language on thinking traditionally have been held by theorists such as Piaget (1970) and Vygotsky (1962), a middle position between both may be more useful educationally. That is, the language of the child and the language of of the adult teacher become interwoven in a dialogue aimed at utilizing both the egocentric symbolic structure of the child and the more stable permanent meanings of the language of the environment. This collective approache utilizes the language of the child and the langugage of the teacher to enhance the potential of the child to better understand selected concepts, processes and strategies.

While recent cognitive training approaches such as Feuerstein et al (1980) have utilized the Vygotsky theory to stress the need for adults to intervene, thereby helping students understand precisely the nature of objects in their environment, it appears that Piaget's concern for active learner participation also has merit. This merit grows out of the hypothesis that mentally handicapped learners are passive rather than active in their approach to academic tasks such as reading and listening. Markman, (1977 ,1979) reported similar findings with students in regular classrooms. Therefore, it appears that any dialogue between a teacher and a student should be enhanced if both the student and the teacher are to have an opportunity to contribute, challenge and refine their concepts mutually. This orientation towards active student participation appears critical for learning to become internalized, for learners to feel responsible for their actions, and for learners to direct their own learning. Creating this feeling of active participation, direction and responsibility on the part of the learner is held to be motivational and to enhance cognitive performance (Feuerstein et al, 1980).

This belief has received support as evidenced by the work of Zigler (1971) who claimed that reduced cognitive performance is frequently mediated in part by reduced intrinsic motivation. Sternberg (1983) concluded that psychologists concerned with behavioral change in the area of obesity, smoking and other substance abuses have recognized the importance of motivation. However, psychologists involved in intellectual skills training in the majority of cases have not been concerned with intrinsic motivation. It is important to recognize that educational programs should be responsive to both the intellectual and affective needs of students (Sternberg, 1983). This aspect of skills training has formed a large part of Feuerstein's (1980) Instrumental Enrichment program. Feuerstein endows the tasks to be performed with specific personal meanings and attempts to utilize non-content materials to avoid negative reactions on the part of students associated with previous content related failure. In addition, Feuerstein continually focuses the attention of the student on how the student has been successful in completing very difficult tasks on their own. This appears to relate to the notion of training for an internal locus of control.

The Role of Locus of Control. The role of an internal locus of control and the notion of self regulation appear to be important aspects that contribute to increased motivation on the part of the student. There is an evolving perception that successful strategy training impacts on the total person's perceptions of self and the ability to control future problem solving situations. Phares (1976) for example, has concluded that the achievement of internally controlled children, as reflected in school grades and test scores, are more substantial than achievements by those children who demonstrated an external locus of control.

Furthermore, previous research has suggested that children and adolescents who lack skill in everyday problem solving and planning tend toward passive avoidance when confronted with situational problems. However, skill in problem solving contributes to a sense of competence which in turn may influence the individual's willingness to recognize and respond to future problem situations (Ross, 1971; Ross et al., 1973; Ross and Ross, 1973).

By way of a definition, an internal locus of control is attributed to individuals who perceive the outcomes of their behavior to causes internal to them such as their effort and/or ability. The external individuals attribute their success and/or failure to causes external to them and hence beyond their control. Examples of external control reasons for success/failure could include luck and task difficulty (Rotter, 1954).

The concept of control over one's environment appears related to White's(1959) concept of competence and to the concept of need achievement as reported by McClellans (1953) and Atkinson (1958). In addition, Rotter, Seeman and Liverant (1962) have stated that internal control is associated with factors of self-assertiveness, activism, hopefulness and positive coping.

Sarason and Sarason (1981) reported that one of the more promising recent developments has been a focus on specific cognitive skills and the self control of behavior. While they did not allude to work in metacognition (the ability to monitor one's behavior), it would appear that self control techniques have implications for research in this area. Meichenbaum (1977), Sarason, Johnston, Barberich and Siegel (1979) and Kendall and Hollon (cited in Sarason and Sarason, 1981), have undertaken programs to improve how people think and solve problems. However, to date, most research has not specifically addressed the role of metacognition and locus of control in improving the monitoring and regulatory skills of individuals. One notable exception is the work of Brown, Campione and Day (1981).

Markman (1977, 1979) has been active in the area of research into children's awareness of their failure to understand or comprehend something read to them. She attributed children's failure to understand directions to their being passive listeners rather than actively confronting the given information. Active confrontation would involve thinking through the steps in a problem solving situation. If a person listens passively and does not apply the knowledge given to a hypothetical situation, the person may be unaware of their own failure to understand. Such a rationale is akin to the notion of monitoring and regulating of information processing as suggested by Lawson (1980) in defining metacognition. The implication of passive processing is that people may be deluded into thinking they have comprehended the directions.

Markman (1977) suggested that the notion of executive processes appeared to emphasize two related concepts. One is the concept that with development individuals come to take a more active, self-directive role in cognitive areas. A second concept is that individuals develop the ability to monitor and evaluate their own cognitive processes. Using these concepts and drawing some inferences with the concept of locus of control it would seem to follow that it is not only one's development that is involved in becoming a more active participator. Whether or not individuals perceive themselves as having the potential for controlling their environment is also involved. In other words, the reasoning of a passive participator may be "Why be active if I am not in a position to alter the outcome?" Such people may in fact be monitoring their own processing of environmental cues and subsequently reach the conclusion that they are unable to succeed—a negative statement. The intervention for such people may be to develop more positive outcome statements, to help such people believe they are more in control and to continue to alert themselves to future negative statements. It also may be necessary to address the issue of accurately reading the situation, to not only realize, but to accept that some situations are indeed beyond one's control.

These hypothesized methods for intervening with those who do not utilize self control techniques have some basis in the notion of locus of control. Sarason and Sarason (1981) have hypothesized that training in cognitive problem solving skills might increase the person's perceived control of the environment. It is important to note that this hypothesis refers to perceived control which may or may not be real control as measured in observable quantities. The importance is not whether control is real, it is whether individuals perceive themselves as exerting control over their environment. The locus of control theory holds that if people perceive themselves as having control they will in principle and within the standards of North American culture tend to raise their expectancy for future reinforcement, with such reinforcement being contingent upon their skill and/or their own efforts (Rotter, 1966).

The notion of feeling of control over one's environment and subsequent positive statements and resulting actions is not new. Becker (1962) for example, viewed a persons's feelings of power (competence, effectiveness) as a key element in man's psychological stability. Even earlier Adler (1927) wrote of man's "will to power" as the modus operandi of man as a social being. Foote and Cottrell (1955) ,in defining interpersonal competence as the ability of man to produce intended effects, stressed the importance for the self of being perceived as a causal agent in the environment.

These concepts of active participation and accepting self responsibility for outcomes appear tied to the concept of being both an actor and a viewer in a cognitive event. Using Falvell's conception of metacognition and Schmidt's notion of cognition in which the task is to try to understand how the cognitive activity of a student moves from awareness and response to more symbolic and conceptual elaborations, it appears that the ability to utilize and direct selected strategies to govern information processing are somehow related to and intertwined with the concept of active participation and to the acceptance of self responsibility for an outcome. After all, with the exception of automatized responses, how can one consciously monitor and direct the use of selected strategies without being an active participant and observer?

As a result of this interest in mental processes and consciousness or the individual's ability to discuss and give an indication of their awareness of their own cognitive processing a number of issues have surfaced.

One issue concerns the materials, techniques and procedures for assessing cognitive processes. This issue will be discussed in a later section. The second issue concerns the ability of individuals to utilize attempts to alter their current processing strategies. Such attempts have become known as cognitive education and are aimed at the training of what is commonly referred to as intellectual skills (Waksman, 1982).

C. Cognitive Education

One approach to producing strategies, those plans or actions to further monitor cognitive processes (Flavell, 1981), and/or remediating inefficient or ineffective strategies is throught what Waksman (1982) has termed "cognitive education." Cognitive education refers to training individuals to acquire, maintain, utilize and monitor strategies to process information (Waksman, 1982).

Some historical roots. The interest in cognitive training procedures is not a new phenomenon in education. As early as the 1880's, programs that promised the enhancement of mental abilities were well established (Mann, 1979). During the 1950's, work by Piaget on "genetic epistemology" (Piaget, 1972), led to a renewed interest in the area of cognitive development. Piaget's conception of intelligence and his theory of stage development have been viewed as providing the theoretical support appropriate to the solution of educational problems. In selecting Piaget's theory as a guide for educational practice and theory, the emphasis was removed from school achievement to that of intellectual enhancement. In pedagogical terms, the emphasis was placed on the "process" of learning rather than on the actual "product" to be learned. This separation of process and product while useful to focus attention on processing should be viewed with caution unless it is clear that both processes and products are to be addressed in teaching. Waksman (1982) stated that the focal point of most of the studies of Piaget's theory was the interest in developing a training procedure which would enhance the learner's cognitive repertoire. It was hoped that this enhancement would maximize the student's chances of benefiting from an academic curriculum. That is, by enhancing the learning process the child would be more capable of mastering academic and day-to-day problem solving situations.

Stephens (1977) described the Piagetian approach to curriculum development as one that emphasized "the need for the pupil to be actively involved in the learning situation: the need for him to proceed at his own tempo, and the need for him to explore and manipulate, to question and seek—in short, to learn to reason" (Stephens, 1977, p. 247). While it is generally held that the mentally handicapped fail to spontaneously produce strategies, a number of researchers claim these students can be instructed to do so (Belmont and Butterfield, 1977; Brown, 1978; Brown and Campione, 1977, 1978; Butterfield and Belmont, 1977; and Glidden, 1977).

As a result of the debate over the efficacy of training of product oriented techniques, examination of a number of process oriented or strategy training techniques across various diagnostic groups has been undertaken. Unfortunately, while appearing to aim at a process orientation, the use of modeling techniques adapted from the work of Bandura (1977), immediate corrective feedback procedures (Harme-Neitupski, Nietupski, Vincent and Wambold, 1982) and the combining of numberous techniques as in the works of Burger, Blackman, Clark and Reis (1982) and referred to as the "shot gun approach" have not resolved the debate over which techniques are effective either singularly or in combination with each other, nor do these techniques adequately address the generic process. Rather these techniques address more specific training procedures. The underlying process or the person's knowledge of that process may or may not be addressed. With this in mind a number of researchers and theorists have undertaken the development of models to address the process aspect more directly.

One example is Feuerstein's Instrumental Enrichment (1980) and its emphasis on mediated learning experience as a means by which one can promote cognitive development. Instrumental Enrichment is one type of prescriptive cognitive training procedure that attempts to address a process rather than a content-specific product.

A second example is the instructional practices developed by Deshler, Alley, Warner and Schumaker (1980). Their procedures to promote acquisition and generalization of skills are provided within a learning strategies model that attempts to address both the process and the product. However, teacher generated strategies are more central to procedures developed by Deshler and his colleagues.

These broader approaches to strategy training appear to focus on the development of in classroom thinking and problem solving strategies as opposed to the all exclusive learning of specific skills.

Extending the conceptual framework: An information processing approach Sternberg (1983) has suggested that a theory to support the cognitive education notion should be one that is based on the principles of information processing. While there might be many arguments for and against such a proposition, it appears that there is some consensus that many authors conceptualize intellectual functioning into three basic thought clusters (Costa, 1983). These may be represented as an input phase, a processing phase and an output phase. Smith and Tyler (1942), Bloom (1956), Guilford (1967), Suchman (1966), Taba (1964), Whimbey (1976) and Feuerstein et al (1980) have used different terms to represent the similar constructs of input, processing and output. For example, Bloom (1956) wrote of knowledge (input); comprehension, analysis and synthesis (processing) and, application and evaluation (output). Suchman (1966) was more direct and wrote of intake-storage, mediation and action.

Feuerstein et al (1980) along with work by Bloom and Broder (1950) and Suchman (1966) has provided lists of what Feuerstein has called "deficient functions." Examples of these deficient functions include: blurred and sweeping perception; unplanned impulsive behavior; lack of or impaired temporal concepts; lack of a need for precision and accuracy in data gathering; egocentric communication; trial and error response; lack of or impaired strategies for hypothesis testing; lack of spontaneous comparative behavior; lack of a need to establish relationships; and, lack of a need for summative behavior. Feuerstein et al (1980) stated that it is towards the altering of these deficient functions that cognitive education should be oriented.

The importance of the teacher. The importance of teacher questions and teacher language cannot be ignored in ensuring students appreciate that thinking processes and strategies are the goals of instruction. Not only should the objectives of thinking be explicit, the implicit teacher behavior also must support communication of the objective. Wasserman (1978), Costa (1983), Davis and Tinsley (1967), Lowery (1980) and Taba, Levine and Elzey (1964) have all commented on the notion that the teacher's questions and other statements provide cues for a student's cognitive performance.

Whether or not each of the following can be classed as information processing theories, concepts provided by Ausubel (1968), Bruner, Goodman and Austin (1956), Bruner, Olver and Greenfield (1966), Bloom, Englehart, Forst, Hill and Krathwohl (1956), Taba, Levine and Elzey (cited in Costra, 1983), Piaget (1970a, and 1970b), and Piaget and Inhelder (1969 and 1973) have contributed to the intellectual processing model that is the focus of current cognitive educational strategies. The reasons for turning to these theorists as a basis for current cognitive educational techniques rests in their approach to how individuals process information. Costra (1983) has summarized this as being the manipulation of the syntactical structure of questions and statements by teachers to invite students to intake information, to compare that information with existing information stored in memory, to draw meaningful relationships and to apply or transfer those relationships to hypothetical situations.

In terms of a Socratic dialogue between the teacher and student, Costa (1983) argued that much of a student's cueing comes not from the question but rather from the teacher's response behavior. If a teacher responds with praise for conformity or criticism of other value judgements, students realize that their individual thinking is not valued. Teacher behaviors that facilitate cognitive enhancement include:

1. Providing a period of silence during which the student can respond (Rowe, 1974).
2. Accepting, building upon, integrating and extending student ideas (Flanders, 1969).
3. Clarifying (Klevin, 1958).
4. Providing additional information (Andre, 1979).

According to Collins (1977) Socratic tutoring is an individualized teaching technique designed to inculcate reasoning in students. Specifically, the student is taught to derive general principles from specific cases and to generalize these principles to new cases. The Socratic teaching method originated with Plato and is constantly used by good teachers to elicit relevant background information and to focus the student's attention on important factors.

Additional guidelines for teacher behaviors are:

1. Include both process and product oriented teaching. That is, teach strategies and teach content knowledge (Wong,

1985). Remember that cognitive strategies are not a substitute for direct instruction which has been demonstrated to be effective in teaching basic reading and math (Adams, Carnine and Gersten, 1982; Carnine, 1983).

2. Incorporate cognitive strategies as an integral component of the instructional sequence (Palinesar and Brown, 1983).
3. Utilize procedures systematically and constantly as based on a sound knowledge (Peterson and Swing, 1983).

Wirtz (1980) has stated that the teacher's role as a mediator of the Piagetian sequence of beginning with real and material actions followed by language is to provide such concrete experiences first, to mediate the experience by inviting students to think about what they see and do, and finally to invite oral language by talking about what they saw and did. Feuerstein et al (1980) using the Vygotsky approach has argued that it is language that is the mediational vehicle that differentiates the human from the animal species. Therefore, adult language should be used at the outset. Costa (1983) has rationalized these apparently divergent views by interpreting the Piagetian concrete operations stage as one during which the child becomes aware of the self interacting with a real objectively verifiable world. During this stage, the child develops inner language. As the child enters the formal-logical stage, the ability to stand away from, to reflect on and evaluate one's own behavior emerges. Whimbey (1976) stated that Binet referred to this "standing away from" as "auto-criticism". Flavell (1977) has termed it metacognition.

The notion that such a capacity is possible only during the formal-logical stage has serious implications for the mentally handicapped adolescent who may not have entered such a stage and would be considered incapable of such metacognitive processes. However, the development of "auto-criticism" -metacognition -- "standing away from" would appear to be at the root of cognitive education.

Strasser (1972), Finch and Spirito (1980), Whimbey (1980) and Feuerstein et al (1980) have suggested that causing students to talk about their thinking processes during (introspection) and after (retrospection) thinking enhances their ability to think. Despite these optimistic outcomes, research has suggested that cognitive strategy training may not be effective with students at the concrete operational stage of cognitive development (Nichol, Cohen, Meyers and Schleser, 1982). Adams, Carnine and Gersten (1982) have argued that many children do not attain this stage until the third or fourth grade, ages nine to eleven. As well, Brown and Smiley (1978) have argued that in most cases students with achievement levels below third to fourth grade will have difficulty generalizing the use of formally taught cognitive strategies. This results from the belief that mastery of the basic skills is prerequisite to acquisition and use of generic cognitive strategies (Brown and Alford, 1984; Lloyd, Saltzman and Kauffman, 1981).

At this stage it may be useful to review two general approaches that have resulted in three cognitive training programs. The approaches are the Vygotsky/Feuerstein Model resulting in Feuerstein's Instrumental Enrichment and the Cognitive Behavior Modification Model (CBM). Two of the better known cognitive traning programs utilizing the principles of Cognitive Behavior Modification are the Learning Strategies Model by Deshler and his colleagues as well as the Self Instructional Training work of Meichenbaum.

Sample Cognitive Training Programs

The Vygotsky/Feuerstein model. Feuerstein et al (1980) held that training for strategy development or more broadly for cognitive growth is felt to occur in one of two ways. One way is through direct exposure to environmental stimuli while the second way is through a "mediated learning experience". Both Feuerstein and Vygotsky ascribed to a mediational approach (Feuerstein, Rand, Hoffman and Miller, 1979; Vygotsky, 1962). The importance of mediation for Feuerstein was not only the content that is learned, but also the cognitive functions and patterns of motivation that emerge. Effective mediation sensitizes the child to procedures that transcend the particular events that are the focus of the instruction. Mastery of a problem situation requires that the child learn to cope with a sequence of events situated in time and space, to integrate and interrelate stimuli and to abstract information. At its most fundamental level, Vye (1983) has stated that a mediated learning experience is one that imparts basic strategies for operating on the environment. These strategies are the prerequisites for learning from direct experience.

For mediation to be effective, Feuerstein held that it should follow four principles. These include:

1. Intentionality - Mediation must be purposeful and goal directed. The mediator selects the to-be-processed stimuli and directs the child's attention to certain objects or events. In the process the mediation aids the child in noticing features other than the most perceptually salient.
2. Competence -- Success experiences demonstrated by the child are assumed to be reinforcing, thereby increasing the likelihood of their repeated occurrence.
3. Transcendence -- In the process of solving the at-hand task, the child acquires basic strategies for gathering and relating information.
4. Meaning -- The task purpose is conveyed.

Vygotsky's approach as noted earlier, also was one of mediation. Social interaction at the interpsychological level leads to independent problem solving at the intrapsychological level. Not the content, but the means of social interacting are internalized by the child. Vygotsky's theory of internalization of mediated experiences was tied to the concept of the Zone of Proximal Development. The Zone of Proximal Development is the zone that stores knowledge and a repertoire of functions that are relevant to, but inhibit, independent solution of a task. An adult mediator elicits behaviors from the child that lead to the solving of the problem task. The child then comes to understand the goals and strategies of the task. Thus, the sequence is behavior followed by analysis with the mediator providing only as much help to the child as is needed for the child to come to a newer understanding of the task.

Vygotsky places a great deal of emphasis on the use of language in helping the child create new cognitive structural centers overcoming the natural structure of the sensory field. As such, it appears that for Vygotsky the child should possess some prerequisite cognitive functions and conceptual skills. However, Vye (1983) has stated that basic mediational principles are the same regardless of skill level. As such, the notion of prerequisite skills need not alter the striving to develop cognitive growth. Initial focussing on the process of mediation itself may take longer and so might the development of social interaction skills. In Feuerstein's terms, more investment to effect cognitive growth may be required. However, the necessity of additional investments does not alter the potential for change.

Research to support the claims of Feuerstein regarding Instrumental Enrichment have been few due in part to its recent implementation. Narrol, Silverman and Wesman (1982) compared five classes of vocational high school students receiving Instrumental Enrichment with five control classes. They found significant differences after one year in favour of the experimental classes on a standardized group test of intelligence. However, significant differences on measures of self esteem were not found.

Haywood, Arbitman-Smith, Bransford, Delclos, Towery, Hannel and Hannel (1982) reported on a series of studies evaluating the Instrumental Enrichment program using over one hundred teachers and one thousand students with varying labels such as learning disabled, emotionally disturbed and culturally different. Haywood and his colleagues found that the program was most successful with students of normal intelligence who were diagnosed as learning disabled. As well, they found that the program worked best when taught by a teacher within the school over three 45-60 minute sessions per week. While Haywood and his colleagues found some transfer to academic areas, they concluded that evaluating a cognitive curriculum cannot be done by standard tests alone.

Rand, Tannerbaum and Feuerstein (1979) compared the effect of an Instrumental Enrichment program with a general content enrichment program on low achieving economically and socially disadvantaged students. Carried out over a two year period on five hundred students in Israel, they found changes in favour of the Instrumental Enrichment groups on the Thurstone Primary Mental Abilities Scale and on a classroom participation scale assessing factors such as conduct, self sufficiency and adaptiveness. No differences on an achievement battery or on self concept scales were found.

Samuels, Roadhouse, Conte ad Zisk (1984) studied fifteen low achieving adolescents at a Calgary Vocational School. Results of comparisons with a group of similar students indicated few significant differences in the groups over three years. While absentee rates did not differ significatly across the groups, the Instrumental Enrichment group remained in school longer and many transferred to more academic programs.

The cognitive behavior modification model. Cognitive behavior modification is based on the social learning paradigm of Bandura (1978); behavior modification (Mahoney and Thorensen, 1974) and research on self regulation (Craighead, Wilcoxon-Craighead and Meyers, 1975); and the cognitive psychology paradigm exemplified by Meichenbaum (1977). The cognitive psychology paradigm holds that the "critical determinants of human behavior lie within the individual" (Mahoney, 1977, p. 6). Other theories on which cognitive behavior modification was based include the concept of a private speech as proposed by Vygotsky (1962) and Luria (1960, 1961a ad 1961b). Private speech is viewed as overt or covert self regulating talk directed to the self (Zigler, 1979). Instructional theory and research focussed on teaching exceptional children "how" and "what" to think has contributed to the development of cognitive behavior modification (Borkowski and Cavanaugh, 1979; Deshler et al., 1980; Meichenbaum and Anarow, 1979; and Maier, 1980).

Harris (1982) has noted almost as many cognitive behavior modification (CBM) training regimes as there are researchers and practitioners working within the CBM philosophy. As such, Harris has suggested the following broad definition of CBM:

> the selected, purposeful combination of principles and procedures from diverse areas into traning regimes or interventions, the purpose of which is to instate, modify, or extinguish cognitions, feelings and/or behaviors. (p.5).

Citing work by Brown (1979), Brown, Campione and Day (1981) and Kendall and Finch (1979), Harris (1982) stated that CBM may be particularly appropriate for exceptional students given that these students typically exhibit an external locus of control, production and mediational deficiencies, and deficits in inhibition, self-regulation, problem solving and means-ends thinking. Furthermore, Camp (1977) and Meichenbaum (1976) have noted that such students have not yet used verbal mediational strategies.

One component/procedure/application of CBM is self-instructional training (SIT). Typicaly, SIT has been used effectively with attentional problems and impulsive behavior. The reader is referred to research and reviews by Craighead, Wilcosin-Craighead and Meyers (1978) and Kendall and Finch (1979) for more detailed information. Self instructional training is built around four basic steps (Meichenbaum and Goodman, 1979). These are:

1. Cognitive modelling -- adult performs tasks while

talking aloud;

2. Overt guidance -- child performs tasks using same verbalization; first assisted by adult and then alone;
3. Faded self-guidance -- child whispers the instructions while working through task;
4. Covert self-instruction -- child performs task guided by covert self-speech.

These four basic steps have been expanded to six supported by behavioral components such as graduated task difficulty, prompts, feedback and social reinforcement. Furthermore, the steps are divided into two levels: task-approach and task-specific. The task-approach statements have been compared to global metacognitive, cognitive and behavioral strategies that are relevant across a variety of related tasks (Harris, 1982). Task-specific statements relate to the task at hand. Some controversy has arisen over the efficiency of task-specific and task-approach statements. Lloyd (1980) claimed task-specific statements are more successful with academic tasks. Kendall and Finch (1979) claimed task-approach statements facilitate generalization. As in the case of "top-down" versus "bottom-up" approaches to reading an integration of the two types of statements may facilitate more effective and more generalizable training.

Meichenbaum (1977) has stated that the student should play an active role in the design, implementation and evaluation of training. Indeed, Meichenbaum went so far as to suggest a Socratic dialogue using the students' advice on how to correct the negative, maladaptive or ineffective cognitions identified by the student. However, this has yet to be enacted. As training progresses, the teacher should gradually fade support for the strategy. Such an approach assumes the student is able to identify the deficient functions and is able to verbalize such an identification to another person.

Harris (1982) concluded her review of CBM by stating that a number of requisite steps are needed prior to implementing a CBM based intervention. These steps include careful analysis of the task and the learner such that both are compatible. As well, the goals of training should be specified and appropriate to the task and the learner.

Deshler's Learning Strategies model. Deshler's Learning Strategies model is designed to teach students how to learn rather than what to learn. Techniques for organizing material to be memorized for a geography test would be addressed in this model rather than the geography content. Alley and Deshler (1979) summarized the model by stating that a learning strategies approach identifies specific strategies, techniques and rules that the student can use in coping with the demands of the curriculum.

Drawing on the work of Flavell, Baker, Miller and Lesgold, Deshler and his colleagues have developed a package of strategies that include verbal mediation (using language in a meaningful way to facilitate the storage and retrieval of information), clustering (categorizing material that has to be remembered) and imagery (making associations between stimulus events and generating a visual picture of the events).

It is interesting to note that while Deshler refers to Levin (1976), the student generated strategies advocated by Levin are not utilized as a teaching style in many of the research documents published by Deshler and his colleagues, despite Levin's statements that student generated strategies are more effective than teacher generated strategies.

Levin (1976) also stated that strategies may be effective for one student but not for another, and, the effectiveness of a strategy is dependent on the nature of the task and the materials.

A need for research.

In discussing the burgeoning expansion of cognitive training programs that was observed in the early eighties, Sternberg (1983) stated that research into these programs should receive careful empirical evaluation that assesses both durability and transferability of training. In addition, facets of the training should be assessed as well as the total training program. That is, intensive observation of what is happening with individuals within the study both during the period of treatment and over extended periods following completion of the training is necessary. Such details will enable the researcher to better comprehend what individuals bring with them to the study and how the various training packages and the researchers impacted on those individuals. Another facet of this intensive observation might include how various individuals within the experiment impacted on the training techniques and the researchers.

Feuerstein (1983) has made the point that teaching is a dynamic process during which materials are utilized, interpreted and modified to suit the interplay of the student and the teacher. Within such an interplay the student and teacher often mesh into a fluid oneness such that each is altered by the experience. As such, the question that must be asked is whether we can ever be certain of knowing what it was that made the difference in effecting success or failure in such an interchange. Careful attention through intensive observation by researchers may aid the understanding of this process.

D. Reading Comprehension as a Cognitive Process

Stauffer (1970) defined reading as cognitive functioning. Support for this position grows out of the conceptualization of the reader as an information processor (Huey, 1908) and as a problem solver (Thorndyke, 1917). Lerner (1981) and Stauffer (1970) have stated that success in reading comprehension is dependent upon the ability of the individual to attend to and actively interact with the ideas and concepts of the writer. As well, the capacity to use and understand language is required. Stauffer (1970) following on Thorndyke's conception of the reader as a problem solver concluded that comprehension was akin to problem solving in that the reader had to employ concepts, develop hypotheses, test out the hypotheses and subsequently modify concepts. Rummelhart (1977) also stated that reading comprehension involved problem solving. He hypothesized that the reader generates hypotheses that are consonant with expectations and cues in the passage, and then seeks confirming evidence.

The question of which aspect of reading should receive the greater emphasis in instruction has been noted by Lerner (1981). While this debate is an important one, for the purposes of this study it will be assumed as suggested by Lerner that both word recognition and reading comprehension should be emphasized for an individual to read.

Despite the debate over which aspect of reading is more important, a number of researchers consider reading comprehension the core of the reading act (Goodman, 1968, 1970a and 1970b; and Smith, 1971). Indeed, Cooper and Petrosky (1976) summarized three themes regarding research findings. These themes were:

1. Fluent reading is not decoding;
2. Comprehension can preceed word identification;
3. Comprehesion stems from an interplay of the printed page and the reader's experiences, language knowledge and cognitive ability.

Fagan (1978), Smith (1975), and Goodman (1970a and 1970b) have emphasized that the reader's goal is meaning. Forrest-Pressley and Waller (1984) have argued that three types of skills are important in reading: decoding, comprehension and mature reading strategies. Citing evidence from Brown (1980), Gibson (1972), Forrest-Pressley and Gillies (1983) and Rothkopf and Billington (1925), Forrest-Pressley and Waller argued that it seems important to consider reading as a complex system of skills.

Whatever the resolution of this debate, it appears as Smith (1975) has stated, that the reader is involved in processing print, actively seeking, selecting, coding, organizing, storing and retrieving information in order to comprehend the written passage. These appear to be the executive or meta strategies referrred to in theories of metacognition. Pearson and Johnson (1978) have described the rereading process as an interaction of internal factors such as language knowledge, prior experience and cognitive structure with external factors such as the printed material and the "reading environment" (p. 10). Reference to the processing of print leads to a consideration of reading as information processing.

Information Processing Theories of Reading

There appears to be three major information processing theories of reading. "Top-down" theorists such as Smith (1975), Goodman (1970a and 1970b) and Anderson (1978) view reading as a conceptually driven process with the reader sampling print to test hypotheses about the subject matter. Rummelhart (1977) has described the "top-down" processing strategy to be one in which the reader proposes possible inputs and then determines whether or not these inputs are present in the input data. Sheridan (1982), Rummelhart (1980), Thorndyke and Yekovitch (1980) and Stein and Trabasso (1982) have described the underlying assumption in schema theory to be that meaning does not lie solely in the print but interacts with the cognitive structure or schemata already present in the reader's mind. That is, the knowledge brought to a reading task helps to determine what the reader will understand from reading (Beck and McKeown, 1984).

This concept is similar to Ausubel's (1968) concept of "ideational scaffolding" or framework for understanding new information. Thus, readers possess cognitive filters through which they view the world and from which they predict and make inferences about what is read. This notion is very similar to Feuerstein's (1980) use of a trainer/teacher as a mediator to filter learning experiences for students not presently capable of mediating or interpreting the world for themselves. It is also similar to the Piagetian (1926) notions of assimilation (a new knowledge base being integrated into an existing knowledge base) and accomodation (a knowledge base or schema being altered to input new information). However, schema theory limits the input to printed materials.

Schema theory according to Sheridan (1982) has some positive implications for the teaching process in that it emphasizes the use of the previous knowledge and experiences of the reader. In addition, schema theory helps the reader to appreciate the need for stating the purposes for reading and the need to ask appropriate questions prior to and following reading. These points are similar to those used by Feuerstein et al (1980) and Alley and Deshler (1979) in their strategy training techniques. As well, Bruner et al. (1966) wrote of the governance of behavior by intentionality through feedback on the relationship between what one has intended and what one has achieved.

The "bottom-up" theorists such as Gough (1972) and Estes (1977) see reading as progressing from analysis of letter features, analysis of words, word strings and sentences. Within each level phonological associations are made and word meanings are accessed from the reader's word knowledge until semantic understanding of a sentence is achieved.

Rummelhart's (1977) information processing model has integrated the apparently dichotomous positions held by "top-down" and "bottom-up" theorists. While Sheridan (1982) has termed the "top-down" model as a psycholinguistic model and the "bottom-up" theory a skills model, Stanovich (1980) has ciriticized the "bottom-up" model for failing to account for the impact of contextual and thematic processing while concentrating on minute analysis of letters and words. "Top-down" models have been criticized for their vagueness in defining the complexity of ideational realtionships.

Rummelhart's integration of the two models accounts for the processing of letters, spelling patterns, words and sentences, as well as the general context, syntax and semantic and syntactical environment in which the words occur and from which meaning is derived. Research by Lesgold and Perfetti (1978), Stanovich (1980) and Schwartz (1980) has been influenced by Rummelhart's integration theory and has demonstrated developmental processing differences between beginning and fluent readers as well as group processing differences between skilled and poor readers on phonological coding activities.

Recently, Perfetti (1984) has provided two definitions of reading. One stated that "reading is thinking guided by print", the "thinking definition" (p. 40). The second definition is that "reading is the translation of written elements into language", the "decoding definition" (p. 40). He hypothesized that the "decoding definition" applied to learning to read while the "thinking definition" applied to skilled reading.

Perfetti (1984) argued that an integrated view of these definitions may be reasonable were it not for the insistence of some that the "thinking definition" applies to reading acquisition as well as to skilled reading. He stated that this assured reading failure because it implies that learning how to read and learning how to think are the same. Using a "decoding definition" of reading leaves a piece of the reading process to other areas of instruction. He concluded his argument by stating the hypothesis that the process of word recognition is important in skilled reading comprehension. Therefore, he concluded, even the "thinking definition" has to make room for decoding for only a reader with skilled decoding processes can be expected to have skilled comprehension processes. He summarized his views by stating that word identification is the central recurring event during normal text reading.

By way of summary, research would appear to support the hypothesis that reading is a complex activity composed of decoding, comprehension and reading strategies (Forrest-Pressley and Waller, 1984).

E. Use of Strategies in Reading Comprehension

The ability to utilize selected strategies in reading has been associated with the concept of comprehension monitoring. Comprehension monitoring is concerned with the reader's ability to evaluate ongoing comprehension processes while interacting with the text and to assume some form of remedial action shoud a failure to comprehend be perceived (Anderson, 1980 and Alessi, Anderson and Goetz, 1979).

The notion of comprehension monitoring is based on Flavell's (1981) model in which monitoring is viewed as comprising four aspects:

1. Knowledge -- Flavell and Wellman (1977) have stated that knowledge is comprised of sensitivity, person variables, task variables and strategies. Sensitivity is the

control of ongoing cognitive processing to suit the immediate reading situation such that the individual can receive, store and retrieve information. It appears that children retrieve information incidentally and intentionally. Incidental recall ocurs without deliberate intent. Intentionally occurs with an intent and can be of two types. One type is elicited preparation in which the child is instructed to remember certain information because questions may be asked about the information. The second type is elicited retrieval in which the child makes a deliberate effort to retrieve information. Intra and interindividual differences comprise the person variables. An intra-individual difference is internal to the individual and is exemplified in knowing a technique that aids one in remembering detail. Interindividual differences are comments one makes about oneself in relation to others and relates to self-concept. Flavell (1981) has defined task variables as those variables concerned with the nature of the information in the cognitive experience as well as knowledge of the task.

2. Experiences -- Flavell (1981) stated that metacognitive experiences refer to any conscious cognitive or affective experience. Such experiences can impact on metacognitive knowledge. For example, a reader may sense his lack of understanding of a passage (metacognitive experience) and decide to read the passage more

carefully to increase knowledge.

3. Strategies -- Flavell (1981) stated that strategies are plans or actions to further monitor cognitive processes. This is similar to Kirby's (1984) definition. Rereading (Garner and Reis, 1981); scanning forward (Markman, 1981), scanning backward (Alessi et al., 1979); note-taking (Orlando, 1980); referring to an expert source (Collins and Smith, 1980); forming a question (Collings et al., 1980); inferencing (Phillips-Riggs, 1981); looking back, reading for main idea, underlining, skimming the whole passage, summarizing and using personal experiences (Garner, 1982) are examples of strategies that have been found in reading tasks.

4. Goals -- Smith (1967) and Fredericksen (1975) support the idea that the reason for reading affects how the individual processes the information. For example, reading for detail versus reading for theme. Goals which initiate and continue the cognitive process may be explicit or implicit. In a reading task these goals tend to be operationalized as the criterial task (Brown, Campione and Day, 1981). It is important to clarify whether the goal set by the reader is the same goal set by the researcher since a differnt goal may result in a different outcome. Furthermore, it is important to remember that goals set by the reader may change throughout the reading experience. As such, the reader's monitoring may be altered (Anderson, 1981). The

interplay of these four aspects is hypothesized to contribute to the concept of comprehension monitoring.

Since the ealy 1900's theorists and researchers such as Heuy (1908) and Thorndyke (1917) recognized and advocated the importance of the reader's monitoring of the comprehension process. As observed by Forrest-Pressley and Miller (1984) it is unfortunate that today, despite the work of Goodman (1976), Brown (1980), Flavell (1981) and Myers and Paris (1978), theorists, researchers and educators are still attempting to refine the theory of comprehension monitoring as well as a methodology to assess reading comprehension strategies.

Assessment of Existing Strategies

Both Harris (1982) and Sternberg (1981) have noted that cognitive assessment is not an easy task and is often neglected. Establishing the learner's initial knowledge state including spontaneous and learner-trainer produced strategies as well as metacognitive skills is essential to determining the match between the learner, the task and the cognitive program (Harris, 1982; Meichenbaum, 1976; Loper, 1980). Within the area of reading comprehension a variety of methodological approaches have been utilized. Among these approaches are retrospection, introspective passages, cloze procedures, scrambled stories and selection and retention of main ideas.

Selection and retention of main ideas. Typically students are exhorted to concentrate on the main ideas when studying. However, to be responsive to attending to the main ideas, students have to be aware of what the main points are (Brown and Smiley, 1978). Brown (1980) citing the work of Smiley, Oakley, Worthen, Campione and Brown (1977) and Brown, Smiley and Lawton (1978) has stated that extracting the main idea was a problem for poor readers and retarded children. However, as children grow older they become more able to identify the essential organizing features of texts (Brown and Smiley, 1977). Developmentally, Brown and Smiley (1978) have documented that from the fifth grade and up, metacognitive control governs the ability to select main idea units. It is not known whether mentally handicapped adolescents will be able to extract the main idea or use a metacognitive control process.

While Brown and her colleagues have found the mentally handicapped have difficulty selecting the main idea unit, the difficulty of understanding the directions associated with the task also may be a factor.

In the Brown and Smiley (1977) study, participants were asked to select the least important quarter of idea units, then the next least and so on until the last quarter of idea units remained. This last quarter would be the most important idea units. Results of the study may have been contaminated by an inability of some of the lower functioning students to comprehend the directions. In other words, task directions rather than the task may be beyond the scope of the mentally handicapped.

Flavell and Wellman (1977) have noted the apparent merit in using the notion of main idea units for assessing metacognitive factors in individuals. Brown and Smiley (1978) stated that this is a promising approach to gain insight into the use of strategies and monitoring by exceptional learners. Such an approach provides a basis for determining whether or not educable mentally handicapped learners have the requisite ability to identify the main points in a story so as to select these main points for extra attention. It would be erroneous to state that the educable mentally handicapped learners cannot use main idea as a strategy in remembering stories without first determining their ability to identify the main idea units.

The significance of this finding to the education of the educable mentally handicapped adolescent rests in devising appropriate instructional procedures to tap and remediate their deficient skill, whether it be identifying main points or the ability to focus on main points for extra study.

Scrambled stories. Yussen (1982) has stated that one skill in reading is the ability to follow a logical sequence of actions. While this is sometimes an easy task, there are instances when such is not the case. Examples include situations where elements of a story are dislocated for an unusual effect, the lack of a clear structure in the story, or situations when elements of the story are missing. There is evidence to suggest that sequencing ability is tied to age (Tanner, 1976 and McClure et al., 1979), and to the complexity of the text (McClure, Mason and Lucas, 1979). That is, older children and less complex passages are subject to better sequencing.

In terms of the Wechsler Picture Arrangement Task (Wechsler, 1974), in which the individual has to manipulate the elements of a mixed-up story continuously available for inspection, Yussen (1982) stated that the person can order the pictures in one of two ways. One way is to figure out how the story begins and select the picture that should come first. Another way is to figure out the theme or main idea of the story and use this to guide the ordering of the picture.

Knowledge of how children go about sequencing scrambled stories would contribute to further understanding the components of cognitive monitoring strategies used by mentally handicapped adolescents. This further understanding would enhance the development of instructional procedures to better equip such exceptional learners with the monitoring skills to improve their comprehension.

In order to tap the "how" of story sequencing it is important to know, as in the case of intact passages, whether individuals possess the ability to identify main idea units of the story prior to determining if these idea units are used as a guide to the ordering of the story. In an initial study of use of idea units as a guide to sequencing, with second, fifth and eighth grade pupils, Yussen (1982) found that while older children did sequence pictures better and did discriminate main idea units better, the ability to sequence picture stories was unrelated to children's ability to understand the main ideas in the stories. As such, he tentatively concluded that sequencing may be tapping skills other than those needed to comprehend and integrate stories. In addition, it would appear that the ability to consciously apportion effort to code the most important parts of a story which Yussen (1982) described as important to comprehension monitoring and which Kaufman (1981) has noted is lacking in the learning disabled, is also lacking in younger (grade two) children. It is suspected that this ability also is lacking in the educable mentally handicapped. Indeed, even sixth grade children did only moderately well on this task. The impact of what to do with adolescents who may still lack both types of skills does not appear to have received much attention in the literature. As such it will be important to assess the processing abilities of exceptional adolescent learners.

Knowledge about the manner in which individuals approach the sequencing task is essential to understanding the organizational and sequencing strategies used in comprehension monitoring by adolescents labelled mentally handicapped. As Yussen (1982) has noted, sequencing makes a close contact with the skills most readers employ to render prose comprehensible when the writing is difficult to follow.

Yussen (1982) stated that the amount of material to be sequenced may have an impact on the participants ability to sequence a story. However, sotries must be of such a length as to maintain a minimal "Kernal" story sequence as outlined by Stein and Glenn (1979) and Rummelhart (1975). Typically the "kernal" story could include an initiating event, an attempt and a consequence. Longer passages might include the setting, initiating event, internal response, plan, attempt and consequence.

Introspective Passages. A number of researchers such as Olshavsky (1977) and Christopherson et al., (1981) have turned their attention to presenting readers with intact passages and asking them to think aloud when they reach the end of a clause, sentence or idea unit signalled by a red dot. Recognition of failure and a re-reading strategy emerged when clauses were examined with tenth grade students in the Olshavsky study. The Christopherson et al. (1981) study revealed differences favoring contextual (title) versus moncontextual (no title) passages in reading. While prior knowledge seems to be important to interpreting a reading text, the strategies utilized by the readers were not addressed.

Brown (1980) has suggested that as the task becomes more difficult, readers may more consciously intervene strategically to comprehend the text. However, caution should be exercised since Olshavsky (1978) found that if the text is too difficult, the incidence of strategic intervention is reduced. It would appear that the difficulty level should be at or near the top of the current instructional reading level of the participants in order to facilitate strategic activity. This strategic activity may then be open for examination by the researcher through the analysis of introspective and retrospective comments by students.

While this approach does not appear to have received wide attention, studies with college students and public school elementary students have been conducted (Lupart, 1984; Collins, Brown and Larkin, 1981; and Phillips-Riggs, 1981. Collins et al (1980) and Phillips-Riggs (1981) conducted studies to determine the inferencing strategies of various age groups of readers. Recognition of these strategies may be useful in determining how readers spontaneously monitor their understanding of the text. Some of the strategies found by the above researchers included refocusing, analysis of alternatives, confirming prior interpretations, neglecting to respond, empathizing with the story/passage experience, rereading, interpreting, conceptual binding, scanning, intuitive action and reattempts.

Caution will be needed in interpreting the responses of the participants in this aspect of the proposed study since self questioning or researcher imposed probes and/or questions to facilitate introspection may affect the nature of participant responses. However, the present study is designed as an exploratory procedure to determine how the strategies of readers with learning problems can be assessed.

Cloze procedures. This procedure developed by Taylor (1953) requires the reader to fill in deleted portions of passages. Jenkinson (1957) has demonstrated the utility of this technique to gain insight into how individuals approach reading comprehension tasks. She combined the cloze procedure with the previously outlined introspection procedure. Froese (1971), Jenkinson (1957), Taylor (1953) and Bormouth (1969) have stated that the cloze procedure is an objective reliable measure of comprehension.

While over 600 articles and research reports have been written about the cloze procedure since its inception in 1953, the overwhelming majority of these investigations have utilized the same model of cloze construction. However, as noted by Hosseini ad Ferrell (1982) no standard method for creating a cloze test exists. As well, few of the studies examined the response of the educable mentally handicapped (McKenna and Robinson, 1980). Henk (1981, 1985) critiqued and studied the typical deletion of every nth word basis, the standard length of blank spaces and the use of only exact word replacements. While accepting synonymic responses increased scores, the use of total random assignment and size of the blank spaces did not affect scores thereby not reducing the validity of the instrument. However, previous studies that examined various deletion rates found every 5th word deletions did affect instrument predictive validity by increasing task simplicity (Meredith and Vaughan, 1978).

While arguments that the cloze procedure lacks sensitivity to the influence of context beyond the immediate sentence have continued for twenty years, MacGintie, (1961), Hoffman (1980), Taylor (1953,) McGee (1981), and Thomas and Bridge (1980) have found that the cloze procedure is affected by intersential contextual constraints. This is an important aspect of the cloze procedure since a lack of inter-sentential context would inhibit students in understanding the meaning of a paragraph or passage.

The cloze procedure has many advantages, particularly if combined with other measures. Jongsma (1980) and Jenkinson (1957) have both commented on the ability of the cloze procedure to provide a slow motion view of the reading process. Nevertheless, Gore (1983) has noted that short passages (75 words in length) with less than fifteen blanks were inappropriate for statistical reliability. However, long passages may prove too difficult for mentally handicapped adolescents. While statistical reliability is not a consideration in the present study, passage length may be a factor in terms of frustration arousal on the part of students.

Work by Bridge and Winograd (1982) based on Halliday's and Haran's (1976) notion of cohesive relationships (the dependency of interpreting one textual element upon another element within the same text) has provided a number of instructional and methodological implications. For example, drawing on the work of Ericson and Simon (1980), Bridge and Winograd (1982) stated that the use of concurrent verbalizations while completing a cloze task appears to lead to greater reliability of the data. In addition, Bridge and Winograd recommended use of a demonstration tape or procedure to ensure that students understand the think aloud procedure despite the possible but unlikely teaching of cohesive ties.

Retrospection. The use of a post-reading interview format has been used to assess the reader's knowledge of comprehension monitoring (Paris ~~and~~ Myers, 1981; Forrest and Waller, 1980; Abermann and Ratekin, 1982). This type of research appears to indicate there may be a relationship between cognitive maturity, comprehension monitoring and reading proficiency. However, Nisbett and Wilson (1977) and Cavanaugh and Perlmuter (1982) have concluded that what readers say they do when reading and how they actually process reading may be very different.

Hare and Pulliam (1980) have noted the potential relationship of reading with verbal articulation. That is, poor readers may be less able to verbalize their processing of the reading task. Such a process is further confounded if the reader has to reflect back on past experiences.

While retrospection as an assessment technique has a number of limitations, some interesting findings do result and can be cross referenced with other data. This aspect of the literature review leads to a review of research methodology associated with studies of strategy use.

F. Research Methodology

Within the context of utilizing the above procedures it is important to exercise caution in the development of passages to ensure ecological validity to the educational setting (Bronfenbrenner, 1976). For example, students typically read rather than listen to stories in schools; passage readability levels should be at the level of the student; and, passages should be extracted from typical texts (Bauman, 1982).

Further, differences in studies may emerge because of differences in the type of passage. For example, the stories used in the Brown and Smiley (1977) study are narrative, a story approach more familiar to students. This is also true of the Stein and Glenn (1978) and Mandler and Johnson (1977) passages. Since students appear to have more exposure to narratives, they may have more knowledge of these stories, and thus, students may be more sensitized to the main ideas in these stories. Expository materials are less familiar and may produce difficulty in grasping the central thought. However, typical classroom texts are expository in nature (Bauman, 1982).

Another example of simple passage design modifications that can influence the outcome of a study is the use or absence of a title (Bransford and Johnson, 1972; Schwartz and Flamner, 1981).

Hewitt (1982) called for more ecologically valid research in naturalistic settings using naturalistic texts and observational techniques. Included was a call to use techniques of self-reports and introspections to provide insights which may provide a basis for theory development and later enhanced empirical research. While calling for these changes, a value oriented conclusion emerged in his call for use of self reports to provide insights that would lead to empirical research. Could it be that self report data and introspective comments are not a legitimate part of empirical research?

Goldstein and Blackman (1978) have summarized two broad approaches to the understanding and prediction of the relationship betwen a stimulus and a response. One is the stimulus-response (S-R) approach while the second is the stimulus-organism approach (S-O-R) . Adherents of the S-R paradigm examine the functional relationship between stimuli and responses. Followers of the S-O-R paradigm hold that one can best predict relationships between a stimulus and a response through the drawing of inferences about the intermediary processes or mediating structures that occur or are posited within the organism. Cognition is one such mediating process.

Researchers interested in studying the cognitive processes involved in reading have used verbal reports as data for some time (Huey, 1908; Olshavsky, 1976-1977; Brown and Day, 1983). Indeed verbal reporting was seen as an important part of psychological investigation prior to the rise of behaviorism (Marbe, 1901).

However, verbal reports have frequently come under attack (Nesbitt and Wilson, 1977; Cavanaugh and Perlmutter, 1982) regarding the learner's access to their own inner thoughts. As well, the issue of automatized unconscious responses resulting in incomplete verbal reports should be considered (Cavanaugh and Perlmutter, 1982).

Other causes for concern with verbal reports include the concern that verbal reporting by handicapped learners with limited linguistic skills such as the young and the mentally handicapped may not provide sufficient data for interpretation (Brown, 1977). In particular, retrospective reports have been challenged due to the fact that memory is involved and some learners may report what one ought to do as opposed to what one actually did (Garner and Anderson, 1981 - 1982).

However, Ericson and Simon (1980) stated that worthy findings can come from well designed verbal report data provided:

1. probing is nonspecific, noncueing and bland (see also Garner and Alexander, 1982);
2. other data is collected and the consistency of these data with verbal report information is assessed;
3. memory confounds are reduced by minimizing the interval

between processing and retrospective reporting.

Unfortunately, the issue of "think aloud" introspective statements interfering with task completion seems most difficult to control. While Ericson and Simon suggested directing the subject to emphasize the task rather than the verbalizations about the task, this does little to provide a priority for what is actually going through a person's mind at the time of on-task behavior.

In a more recent article, Ericson and Simon (1984) stated that verbal data-gathering and data-analysis methods vary tremendously with sketchily reported methods appearing in research publications. Acceptance of verbal reports as data appears to be far from universal (Chang, 1983). However, Afflerback and Johnson (1984) stated five advantages of verbal reports:

1. Verbal reports provide insights into otherwise unknown processes.
2. Verbal reports provide support for converging data sources.
3. Verbal reports allow access to reasoning processes underlying higher level cognitive activity.
4. Verbal reports are sometimes the only avenue for analysis of mental processes.
5. Verbal reports enable analysis of the affective components of reading processes.

Afflerback and Johnson (1984) went on to outline the conditions under which verbal reports could benefit research and the necessary conditions to ensure maximum utility and validity. Included were:

1. The provision of training to subjects involved in verbal reporting studies such as in the practice think-aloud sessions of Kavale and Schrieiner (1979). This training should be followed by periodic reminders to "think aloud" (Johnson and Afflerback, 1983).
2. The provision of verbal reports concurrently with the completion of an experimental task leads to an intertwining of the experimental task and reporting on the task. This leads to a trade-off on one or both activities. Researchers have to be aware of this.
3. While probes can serve the purpose of eliciting verbal reports, one must be aware of the effect they may have on the processes being reported. Probes may interfere with a person who is absorbed in the task (Hayes and Flower, 1980). However, probes also increase the frequency of the report (Olshavsky 1976-1977). Use of non specific, non-cueing and bland counselling type reports also are recommended (Garner and Alexander, 1982; Gordon, 1970; Ericson and Simon, 1980).
4. Subject selection for inclusion in verbal reporting procedures is a key factor. While research using verbal report data has used subjects ranging from eight years old to college professors, most studies have used university students. Problems exist with younger and less verbal subjects who may produce less verbal reports

than older more verbal subjects. As well, factors such as "automatized" responses and subject anxiety in a verbal reporting procedure are factors to be considered. Adjusting task difficulty to ensure the task is de-automatized and ensuring subjects feel comfortable were suggested.

5. Analysis of verbal report protocols require advance response classification schemes. Fareed (1971) advised that responses should not be forced into any pre-existing categories. Not all strategies are reported directly leaving the researcher to infer some of the strategies. Use of an inter-rater reliability procedure to ensure consistency of interpretation was recommended. While traning of raters may aid rater performance, it may decrease the validity by producing an inappropriate convergence of perspective.
6. Where possible, multiple indications of the task should be recorded. Afflerback and Johnson stated that the researcher should verify verbal reports of subjects as in the example of verifying that a person who stated, "I am skimming the page" was so doing by observing eye movements. As well, concurrent retrospective and introspective reports can be used along with subject performance and experimenter observation of the subject's behavior.

While trade-offs exist in the use of verbal report data, used appropriately, verbal reports can offer a unique opportunity to view cognitive processing. Rather than focus on the limitations of such a venture, the door of opportunity to minimize and acknowledge limitations should be accessed.

G. Summary

While recent applications of cognitive training programs have yielded promising results, many questions remain to be answered. For example, the impact on individual students of strategy training programs is relatively unknown given the use of group data based on global product oriented outcome measures as represented in recent studies by Samuels et.al. (1984) and Narrol et.al. (1982).

As well, the belief that the mentally handicapped do not spontaneously generate strategies, fail to monitor their progress (Ashman, 1984), possess an inert verbal system (Luria, 1961) and may not be able to benefit from cognitive training (Nichol et.al., 1982) combine to reduce the quantity of academic strategy development research particularly in the area of reading (Terry and Pakes, 1985).

Despite these concerns, some researchers such as Feuerstein (1980) and Meichenbaum (1974) developed techniques which may prove useful with educable mentally handicapped. However, many of these procedures including the use of a Socratic dialogue (Collins et.al., 1977) have not been attempted with the educable mentally handicapped.

Perhaps a more serious concern is the lack of standardized procedures to obtain qualitative and quantifiable data regarding the nature of strategy use and the impact of cognitive training on existing strategies. Recent attempts at combining introspective and retrospective techniques with cloze passages as developed by Taylor (1953), introspection passages (Olshavsky, 1977), scrambled stories (Yussen, 1982), and main idea selection (Brown and Smiley, 1978) offer promising leads. However, the procedures have been criticized by a number of authors such as Nesbitt and Wilson (1977) Cavanaugh and Perlmutter (1982). Despite the criticisms worthy findings are possible using well designed verbal report data (Ericson and Simon, 1980 and Afflerback and Johnson, 1984).

The present study has been designed to explore existing reading comprehension strategies in educable mentally handicapped adolescents, to determine which measures best tap the use of those strategies and to examine the impact of short term cognitive intervention programs on existing strategies. Chapter III provides a detailed overview of the study.

III. METHODOLOGY

In this chapter, the design of the study is outlined. Included are the procedures that were followed in determining the sample, in selecting and designing the materials and test instruments, in administering and scoring the test instruments, in selecting and training the confederate teachers, in selecting and designing the instructional techniques, and scoring the introspective audio and video tapes. The limitations of the study also are outlined in this section.

A. The Sample

All fifteen students in the sample were in their fifth year at L.Y. Cairns School in Edmonton, Alberta. The students were randomly selected from the total group of fifth year students at L.Y. Cairns School so that all fifteen had the following characteristics in common:

1. Possessed a full scale, verbal and performance intelligence quotient between 60-70 on a Wechsler Intelligence Scale for Children - Revised (administered within the past four years). In addition, all scaled scores had to be within one standard deviation of each other.
2. Possessed a vocabulary and reading comprehension grade equivalent within a 1.5 grade equivalent range of each other. The actual grade range for vocabulary was 4.2 to 5.6 while the actual grade range for comprehension was

4.2 to 5.2 according to the Stanford Diagnostic Reading Test Brown Level.

3. Did not possess any emotional, physical, sensory, cultural or language differences as indicated by the teachers, counsellors and administrators at L.Y. Cairns School; nor from a review of student files while attending other schools.
4. Were between the ages of 16.7 years of age and 18.6 years of age at the time of the study.

The sample of students was selected to limit the range of intellectual, reading and experiential factors. It was hoped that on some characteristics, the sample would be relatively homogeneous. While the Auditory vocabulary subtest on the Stanford Diagnostic Reading Test was utilized, information on sight vocabulary based on the Sight Vocabulary subtest of the Wide Range Achievement Test also was gathered. A range in grade equivalents of 4.1 to 5.9 was found on the Sight Vocabulary subtest of the Wide Range Achievement Test. Given the similarity among vocabulary and reading comprehension based on the three measures, it was held that the global reading level of the students was in the range of grade 4 to 6. This was confirmed by teacher reports.

L.Y. Cairns School was selected because it provides programs for educable mentally handicapped adolescents in Edmonton, Alberta. The school serves as a central receiver school for students in programs operated by Edmonton Public

Schools in the City of Edmonton. As well, a number of school jurisdictions in the area surrounding the City of Edmonton refer students to L.Y. Cairns School. It was held that students in the sample would be representative of older adolescent educable mentally handicapped students in the Edmonton area.

The fifteen students were randomly selected from 25 students who fit the descriptions outlined above. These fifteen students were randomly assigned to one of three instructional conditions with the result that 3 females and 2 males were assigned to each instructional condition.

B. The Setting

Experimental procedures were conducted in offices and small rooms located at L.Y. Cairns School. Routine school background noise, messages through the public address system and classroom period organization contributed to the ecological validity of the study. All students were released from their regular academic classes at convenient times to participate in the study. None of the students missed their physical education classes nor shop classes. Academic periods that were considered essential by the teacher or the student were not missed. As well, parental permission was gained relative to student participation prior to beginning the study.

C. The Research Design

This study was designed as an exploratory venture to determine the feasibility of identifying the reading comprehension strategies of educable mentally handicapped adolescents. As well, the impact of two short term cognitive training approaches was investigated. Within the context of exploring methods, materials, instruments, procedures and the capacities of the educable mentally handicapped adolescent to participate in and benefit from strategy instruction, five specific purposes were specified:

1. To explore the nature of strategies utilized by educable mentally handicapped adolescents in a reading comprehension exercise.
2. To determine which of four previously selected types of reading assessment techniques would elicit reading comprehension strategies.
3. To determine the nature of self acceptance for academic achievement and global outcomes held by the educable mentally handicapped adolescent.
4. To determine the academic problem solving strategies of the educable mentally handicapped adolescent.
5. To determine the impact of short term instructional interventions utilizing two previously selected instructional procedures on existing strategies, self acceptance for responsibility for outcomes and teacher perceptions of academic problem solving strategies.

Because this study was designed as an exploratory field study to examine methodology, an intensive case study approach was utilized across treatment and instructors. As well, a quasi experimental pre-test/post-test control group design (Campbell and Stanley, 1960) with an N of 1 random assignment per cell was utilized in an attempt to ensure rigor in the methodology, and to enhance confidence in the findings. Since educational research ultimately has to be of use to two of the many partners in the educational endeavor, the student and the teacher, four instructors in addition to the author were utilized in the instructional process. Any effect resulting from one instructional procedure could be viewed with greater credibility since it would have to occur across five different instructors.

D. Organization of the Study

Figure I outlines the organization and sequence of the study. Prior to initiating the exploratory study , a small pilot study involving six educable mentally handicapped adolesents similar to those in the study in age, years in school, intelligence and reading level was conducted to evaluate the instruments and materials. Results are reported throughtout the body of this chapter.

Figure I

Sequence of Events in the Study

I
GATHERING BACKGROUND DATA

II
RANDOM ASSIGNMENT

III
CONDUCTING PRE THINK ALOUD ASSESSMENTS

IV
CONDUCTING THINK ALOUD TRAINING

V
CONDUCTING THINK ALOUD PRE INSTRUCTION ASSESSMENTS

VI
PROVISION OF INSTRUCTION

VII
CONDUCTING THINK ALOUD POST INSTRUCTION ASSESSMENTS

VIII
CONDUCTING PEER TEACHING

IX
CONDUCTING INTERVIEWS

Background data and assignment of students.

Following the collection of background school data including reading and intelligence test scores, students were randomly assigned to one of five instructors and one of three instructional conditions as outlined in Figure II.

Pre-think aloud.

Selected instruments including two measures of locus of control, a teacher rating scale, and reading passages designed as cloze, scrambled sentences and idea unit stories were administered to determine student functioning without the influence of think aloud. This was called the pre think aloud condition. All the reading passages and the two locus of control scales were presented in a random order. As well, each type of reading passage was repeated three times. A randomized presentation of the three passages across students and instructors was used.

Think aloud training.

Following collection of the pre aloud data, students were trained to think aloud. Two math problems were used to train students to think aloud while solving a problem.

Think aloud pre.

Following completion of the think aloud training, a series of reading passages designed to measure student strategy use as elicited by overt introspective verbalizations and responses to retrospective questioning on scrambled sentences, cloze, introspection and idea unit selections was administered. The passages were presented in random order across instructors and students. As with the pre think-aloud assessment, the order of repeating the three passages was randomized. This session was called think aloud pre since it involved the gathering of data using a think aloud procedure prior to the intervention.

Intervention.

Following collection of the data in the aloud pre condition, those students in the instructional conditions received one of two instructional approaches. Students in the control group continued their regular classroom instruction.

Think aloud post assessment.

Following the intervention, another three versions of the reading passages in each of the scrambled, cloze, idea unit and introspective passages requiring overt introspective verbalizations and responses to retrospective questioning was administered in a random order across type of passage, instructor and student. As well, both measures of locus of control, the reading assessment and the teacher rating scale were repeated. This session was labelled think aloud post because it came after the intervention and required a think aloud component.

Peer teaching.

Following collection of the data in the aloud post condition, students in the study were asked to assist a younger student in a reading comprehension exercise. The purpose of this activity was to determine whether any of the strategies gained during the intervention would be used by the students in working with a younger student.

Interview.

Upon completion of the peer teaching, students were interviewed regarding their perceptions of the total process.

Because of the attempt to maintain a valued teacher/learner relationship throughout the study, students were referred to as students not subjects, researchers were referred to as instructors (one of whom was the author), teachers continued to be called teachers, students involved in peer teaching were referred to as "students as teachers".

Figure II

Schematic View of Study

		INSTRUCTIONAL CONDITIONS		
		Control	LSET*	SIT**
INSTRUCTORS	1 male	Student 12 female	Student 5 male	Student 14 female
	2 female	Student 15 male	Student 6 female	Student 7 male
	3 female	Student 11 male	Student 4 male	Student 3 female
	4 male	Student 1 female	Student 2 female	Student 10 female
	5 male	Student 13 female	Student 9 female	Student 8 male

* LSET: Learner Strategies Enabling Thinking
** SIT: Self Instructional Training

E. The Instruments

Published Instruments

1. The Wechsler Intelligence Scale For Children-Revised

In order to select students who fell within a relatively homogeneous intellectual group, the Wechsler Intelligence Scale for Children - Revised was selected to determine current intellectual functioning. Based on the premise that while individual fluctuations may be great, there is a greater stability of intelligence test scores for older and lower functioning individuals (McCall et.al., 1973), results of assessments conducted within the previous four years were utilized. As well, some students had received previous administrations of the Wechsler with a high degree of consistency being found in test results.

Factors contributing to the selection of the Wechsler included its adequate validity using a variety of ability and achievement measures and its high reliabilities (Sattler, 1982). Known limitations of the WISC-R such as limited availability of norms for children older than 16 years 8 months of age and limited floor effects did not apply to the present sample. None of the students at the time of testing were older than 16 years 8 months, nor did any of the students score below a full scale IQ of 60.

2. The Stanford Diagnostic Reading Test Brown Level

The Stanford was utilized to obtain a global reading comprehension score. As well, the auditory vocabulary subtest was administered to provide information on the current vocabulary level of students. Only students with consistent (within one grade level) vocabulary and reading comprehension scores were selected to participate in the study. Selection of the Stanford was based on its excellent standardization procedure, reliability levels and criterion related validity (Salvia and Ysseldyke, 1985). The Brown Level was selected as per guidelines provided in the Administration and Interpretation Manual (1976). These guidelines stated that the Brown Level is intended for use with low achieving (grades 5 through 8) high school students. The Green Level was found to have a ceiling effect with a similar group of students involved in a pilot study by the author.

3. The Sight Vocabulary subtest of the Wide Range Achievement Test

The WRAT had been administered within the past six months at L.Y. Cairns School. The results of the sight vocabulary subtest were used to provide another check with the Auditory Vocabulary subtest of the Stanford. As well, sight vocabulary was in the same receptive mode that students would use in the study. Since the WRAT has no validity or reliability data, was inadequately standardized and has a limited behavior sampling, scores were used purely as rough indicators of current sight vocabulary.

4. Locus of Control Utilizing:

The Rotter Internal/External Control Scale (Rotter, 1966)

The Intellectual Achievement Responsibility (IAR) Questionnaire (Crandall et.al., 1965)

Both the Rotter and the IAR were utilized to determine whether students accepted self responsibility for the outcomes of their actions or attributed outcomes to external factors such as luck and task difficulty. While the Rotter IE Scale is reported to be the most used and serviceable test for adult populations to assess individual differences in acceptance of self responsiblity for outcomes, it is less than perfect (Phares, 1976). In order to provide a broader perspective and to enhance quantitative observations of the self acceptance for outcomes or locus of control factor, the IAR Questionnaire also was utilized. The IAR Questionnaire examines children's beliefs regarding responsiblity for outcomes in academic achievement situations. While the IAR Questionnaire may be in need of further refinement, it may be the most serviceable measure of locus of control beliefs in children in the relatively specific areas of intellectual-academic achievement (Phares, 1976).

Author Designed Instruments

A. Teacher Rating of Student Approach to Classroom Academic Problem Situations

Following a review of the literature on cognitive education, a teacher rating scale (see Appendix A) was designed. The purpose of the teacher rating scale was to determine teacher perceptions of student approaches to classroom academic problem solving situations, particularly as they related to reading activities. A total of ten statements were given. Language Arts and Mathematics teachers were asked to rate on a five point Likert scale their perceptions of student approaches to academic problem solving in mathematics and language arts classroom work.

The primary information gained from the rating scale indicates whether or not students approach problems in a systematic manner. Questions relate to whether or not the student:

1. is focused on directions (#4)
2. clarifies and ensures directions are understood (#5)
3. organizes self prior to initiating action (#'s 1 and 2)
4. is focused on relevant information (#3)
5. utilizes a systematic approach in work (#6)
6. utilizes spatial organizational skills (#9)
7. develops and tests hypothesis regarding problem solution (#8)
8. communicates clearly and in detail (#'s 7 and 10).

These concepts pertain to information provided by Feuerstein et.al. (1980) relative to deficient cognitive functions. Deficits in these areas indicate a potential difficulty in processing information at the input (items 4 and 5), elaboration (items 1, 2, 3, 6, 8, and 9) and output (items 7 and 10) stages. As well, items 1 and 2 and items 7 and 10 tap similar information in an attempt to provide a reliability check of teacher completion of the scale.

The rating scale was field tested with a group of teachers not involved in this study as well as with colleagues in the Ph.D. program in Educational Psychology at the University of Alberta. As well, the scale was reviewed by three faculty involved in cognitive education programs. The purpose of the review was to ensure interpretations of items were similar and that statements were readily understandable. Suggested changes were incorporated into the version used in this study.

Reading Materials

It was decided to utilize four types of reading strategy assessment materials to determine the existence of strategic behavior in the reading performance of the mentally handicapped student. As well, it was hoped that the four types of passages would ensure maximum generation and confirmation of reading comprehension strategies across a variety of conceptual domains.

All materials were field tested with graduate student colleagues and with six educable mentally handicapped students similar to those in the study.

Factors affecting the selection and nature of materials included:

1. Length: Passages had to be long enough to provide a range of verbal responses, yet short enough to avoid

frustration and fatigue (Gore, 1983).

2. Difficulty: Passages had to be sufficiently difficult to cause the reader to monitor their comprehension using a conscious mode thereby avoiding automatized responses. However, passages could not be so difficult as to lead to frustration (Brown, 1980).
3. Nature of Passage: Within the cloze and introspective passages, non fiction expository material was used in all conditions. Mitchell (1981) found a greater incidence of statements reflecting monitoring in non fiction reading situations. The idea unit passages were selected from those used in the Brown and Smiley (1977) study. All idea unit passages were rated as fictional. In each cloze and introsptecive passage the main idea was judged to be explicitly rather than implicitly stated.
4. Content: In an attempt to ensure ecological validity, the passages more or less matched the typical reading material used by the students and encountered in the school situation. However, this aspect presented a difficulty in obtaining materials that have not been used by students. Checks with teachers, and students prior to random assignment to the study as well as a review of the cumulative reports indicated with a reasonable degree of confidence that students had not dealt with the materials at their current level. While the reading passages were selected by the researcher, it

was felt that this did not adversely affect the ecological validity of the study since most reading material read by students at the school level is not self selected. Furthermore, readers of self selected material may choose material requiring less cognitive effort, and consequently less monitoring may ensue.

With the exception of passages for the idea unit selection taken from Brown and Smiley (1977), reading material was selected and adapted from grades 4, 5 and 6 supplementary reading programs such as Reader's Digest New Reading Skill Builders and Reader's Digest Educational Division Science Readers. Materials were checked for reading level, content, length, difficulty and passage nature. Modifications were incorporated and the reading level verified through the use of Fry Readability Graph (1977). While the Fry Readability Graph is a gross measure, it has been found to correlate (.85) with the Dale-Chall Readability Formula designed for materials from fourth grade through college level (Burns and Roe, 1980).

All reading passages and assessment techniques were field tested on six students with a similar background to those in the study including reading level, intellectual functioning, age and sex. Further modifications based on field testing were incorporated into the passages used in the present study.

Because field testing indicated a need to modify all intended approaches to suit the reading comprehension skills of the educable mentally handicapped, each reading passage type and procedure is described in some detail. Copies of the passages for Pre-Think Aloud are found in Appendix B. Appendix C contans copies of the Think Aloud Pre Intervention measures. The Think Aloud Post Intervention measures are contained in Appendix D.

Cloze Passages

Fry readability measures confirmed the reading level of the cloze passages ranged from grade 5.0 to grade 5.7 (see Table I). While this would suggest that all the passages are of roughly equivalent difficulty, the cloze readability procedure was used as an additional control measure.

For the purposes of determining the cloze readability, all passages to be used in this study were administered to six students of similar background to those in the study. It would appear that story 4 in the pre aloud measure and story 7 in the aloud post measure were somewhat more difficult while story 2 in the pre aloud measure may have been a little easier for students (see Table II). Despite this possible difference, it was decided to include all passages, since the differences did not appear significant. Passage order was randomized across all six students who assisted in the field testing. It should be noted that because of a limited student pool, some of these students may have been different from students in the main study for reasons other than reading level or intelligence quotient.

Table I
Fry Readability Scores for Cloze Passages

	Passage	Readability Grade Score	Average
Pre Aloud	1	5.5	5.2
	2	5.0	
	4	5.1	
Aloud Pre	3	5.5	5.4
	5	5.7	
	6	5.0	
Aloud Post	7	5.0	5.2
	8	5.5	
	9	5.2	

Table II
Cloze Prodedure Percentage
Correct Scores for Field Test Group

Participant	Passage Percentage Scores								
	1	2	4	3	5	6	7	8	9
1	25	29	24	25	26	25	23	27	21
2	27	25	22	26	27	26	21	29	28
3	21	25	21	21	23	20	20	23	22
4	29	29	27	30	28	27	25	26	29
5	30	39	29	32	34	31	27	33	35
6	22	27	20	20	19	19	17	15	15
X %	25.6	29.0	23.8	25.6	25.2	24.6	22.2	25.5	25.0

Results of both reviews appear to indicate that the passages were of sufficient difficulty to ensure monitoring, yet avoiding frustration.

The length of the passages was set at approximately 290 to 355 words with an average deletion ratio of 9.3 / 1. Words deleted were limited to nouns and verbs with a few adjectives being deleted. The rationale for deleting nouns and verbs grew out of an earlier exploratory testing of sample cloze passages with a group of 3 educable mentally handicapped students. Results indicated that these students became extremely frustrated finding words other than nouns and verbs. It was felt that the key aspect in the present study was to tap the existence of strategies, not to generate statistically discriminating comprehension passages. No title was provided for the passages. Typically, the first sentence included a blank space where feasible. With a few exceptions, substitute words were not accepted. While these procedures do not represent the typical format for using the cloze as a measuring device (Tierney et.al., 1980), these changes were necessary in order to achieve what appeared to be a functional passage to elicit strategies by the educable mentally handicapped adolescent.

Introspective Passages

Fry readability measures confirmed the reading level of the introspective passages to range from grade 4.5 to grade 5.7 (see Table III). The introspective procedure followed techniques described by Olshavsky (1977) and Christopherson et.al. (1981). Specifically, a dot was placed at the end of each sentence and students were requested to read, stop, and think aloud at each dot. No pre think aloud passages were

Table III
Fry Readability Scores for Introspective Passages

	Passage	Readability Grade Score	Average
Aloud Pre	1	4.5	4.8
	2	4.5	
	4	5.5	
Aloud Post	3	4.1	5.0
	5	5.7	
	6	5.1	

used since the pre think aloud process involved silent reading rendering the use of introspection meaningless in this condition.

Scrambled Sentences

In order to examine the sequencing abilities of educable mentally handicapped adolescents, stories were adapted from grade 4 level readers. While based on the design used by Yussen (1982), the passages were composed of actual sentences rather than pictures.

In a pilot study with a group of students similar to the students in the research, it was found that educable mentally handicapped adolescents could not handle long (more than 20 sentences) passages and had difficulty sequencing short (as few as four sentences) passages. This confirmed a belief held by Yussen (1982) that the amount of material to be sequenced may impact on the students' ability to sequence a story.

Table IV
Scrambled Sentences -- Number Correct for Field Test Group

Participant	Passage 1	2	3	4	5	6	7	8	9
	Number Correct on 3 Sentence Length								
1	C	C	C	C	C	C	C	C	C
2	C	N	C	C	N	C	N	C	N
3	C	C	N	N	C	C	C	N	N
4	N	N	C	N	C	N	N	N	C
5	N	N	N	N	N	C	N	C	N
6	C	C	C	C	C	N	C	N	C
Number Correct	4	3	4	3	4	4	3	3	3
	Number Correct on 5 Sentence Length								
1	C	C	C	C	C	C	C	C	C
2	C	C	N	C	C	N	N	N	C
3	C	C	C	C	N	C	N	C	C
4	N	N	N	N	N	N	N	N	N
5	N	N	N	N	N	N	C	N	N
6	C	C	C	C	N	C	C	C	C
Number Correct	4	4	3	4	2	3	3	3	4
	Number Correct on 7 Sentence Length								
1	C	C	C	C	N	C	N	C	N
2	N	N	C	N	C	N	C	N	C
3	N	C	C	C	N	C	N	C	C
4	N	N	N	N	N	N	N	N	N
5	N	N	N	N	N	N	N	N	N
6	C	C	N	N	C	N	C	N	C
Number Correct	2	3	3	2	2	2	2	2	3

As a result of the pilot study, a series of 27 stories were adapted from grade 4 high interest low vocabulary level comprehension training (Readers Digest). Three stories were developed at each of 3, 5 and 7 sentence lengths corresponding to 3, 5 and 7 idea units for the three conditions in the present research. These new passages were field tested on six students resulting in a range of success patterns indicating that the passages were difficult enough to ensure monitoring, yet not so difficult as to become frustrating (see Table IV).

Idea Unit

Six passages utilized in research by Brown and Smiley (1977) were selected for use in the present study. The passages were fictional and were written at the grade 4 reading level.

Brown and Smiley (1977) used an approach adopted from Johnson (1970) that involved asking subjects to classify information within a passage as to its importance level across four levels of importance. The pilot group of mentally handicapped adolescents could not complete the task despite being able to define or being instructed regarding the nature of a main idea. This finding was not totally surprising since Brown and Smiley (1977) found that six year olds could not differentiate between the four levels of importance. Further, in 1977, Brown and Smiley found that third graders were unable to differentiate between the levels of importance while fifth graders could separate only the high level from the other three. While the results of the study are suspect, due to material complexity, unit size and the difficulty level of the rating task, it indicated the need to modify the task to tap whether or not educable mentally handicapped adolescents discern the most important parts of a story.

Since it is an assumption that the gist of a story corresponds to the main idea, and the concept of a main idea may not be well rooted, students were asked to select twelve most important parts of the story so that a fellow student could understand what the story was about without having to read the whole story. Utilization of this technique appeared to assist students in the pilot study complete the task.

Three graduate students selected and ranked the 12 most important ideas in the six stories prior to use in the study. These rankings are indicated in the passages. One hundred precent agreement was obtained for the rankings.

F. The Intervention

Two training procedures were utilized in addition to the control group which received traditional classroom instruction.

Self-Instructional Training (SIT)

This procedure involved teaching the student verbalizations that follow a step-by-step sequence. The verbalizations that are related to the specific objectives in the problem solving strategies, are modelled by the instructor and then rehearsed by the subject (Meichenbaum, 1977). Eight basic steps existed in the self-instructional process.

1. Problem Definition: "What is it I have to do?"
2. Focus Attention: "I have to concentrate on what it is I have to do."
3. Read: "First I read the paragraph."
4. Ideas: "Now I will look to find what the paragraph is about."
5. Main Idea: "Now I will see what the main idea is."
6. Describing: "Now I will tell the teacher about this."
7. Hypothesis Testing: "Now I'll check to see if I am right."

The instructor, while working through the procedure with the student, provided immediate corrective feedback as the student progressed. Sample comments utilized to assist in the feedback included:

"Yes, that's right."
"No - not quite - what other idea did you notice in this?"
"No - not quite - you said this was one idea because - - - - - . What else might fit here?"

Appendix E contains the package of materials developed for the Self Instructional Taining Procedure. The Self Instructional Training Procedure is much more teacher-directed than the second technique known as Learner

Strategies Enabling Thinking (LSET).

Learner Strategies Enabling Thinking (LSET)

LSET is a much more student centered and directed procedure than is the Self Instructional Training procedure. It is based on the work of Piaget (1972), Feuerstein et al (1980) and Vygotsky (1962), regarding active student involvement in a mediational approach, the use of a Socratic dialogue based on the work of Collins (1977), and the concept of student generated strategies (Levin, 1976). While LSET utilizes the intent of the cognitive psychology paradigm exemplified by Meichenbaum (1977) regarding the concept that the critical determinants of human behavior lie within the individual, it is not a structured self instructional procedure utilizing teacher modelling. LSET focuses on the learners' development and monitoring of their own strategies -- hence, the emphasis on Learner Strategies.

LSET is aimed at helping the learner develop and/or recognize the existence of strategies for effective learning. Further, LSET aims at helping the learner apply these strategies effectively. The imposition of instructor strategies is not advocated. Rather, the emphasis must be on helping the learner elicit and reveal a clear, concise and specific expression of the strategy as well as how, when and where to apply the most effective strategy. Modeling by the teacher of the correct procedure is not advocated since this conveys an implicit message to the learner that "I can't do it without help". Such a mind set is held to reinfoce an external locus of control which results in weakened future attempts to solve a problem.

The role of the instructor in LSET is to engage the student in a socratic dialogue to systematically lead the learner through the provision of clarifying questions to an insight into how to solve the problem and to provide the learner with the opportunity to apply the process so that the outcome is achieved. LSET involves the teacher and learner as mutual partners in a cooperatively planned learning experience whereby both teacher and learner have the potential to grow. Steps in the interaction include:

1. Setting the stage of mutual agreement on the goal to be achieved. This begins process of internal locus of control.
2. Mutually clarifying the nature of the goal.
3. Mutually clarifying timelines regarding working together.
4. Examining reasons for learning not only selected content, but also the process of learning.
5. Utilizing academic content, a Socratic type dialogue aimed at helping the student acquire, maintain and generalize effective strategies for use in academic problem solving situations is continued. This integrates "how" a student learns with "what" a student is required to learn.
6. Utilizing procedures to ensure the strategies become

automatized. This may include the use of student generated mnemonic devices or any other student generated technique to reinforce strategy use and retention. Since the focus of the present study was more on acquisition and maintenance than on generalization, this aspect was not emphasized.

7. Utilizing positive reinforcement procedures and conveying both explicitly and implicitly that the student has the potential to benefit.
8. Mutually assessing the effectiveness of strategy use.
9. Utilizing procedures so that students come to monitor their own performance to be both a participant and an observer of the learning process. Refers to "meta" skills in efficient learners.

Some key instructor behaviors to practice and reinforce in implementing these steps included:

1. Allowing time for the student to respond (Rowe, 1971);
2. Accepting, building upon, integrating and extending student ideas through active student participation (Flanders, 1969);
3. Ensuring information presented by the student is clearly understood by all participants (Klevin, 1958);
4. Requiring that additional information and reasons for and against a statement are provided (Andre, 1979).

Key factors in the learning environment that are advocated in the LSET approach included:

1. Mutual respect for the participators in the learning

situation.

2. The instructor has a clear plan in mind.
3. Both process and content are addressed in the plan.
4. A repertoire of concrete and abstract examples are available to the instructor to illustrate, extend and clarify statements by students.
5. The instructor exercises judgement as to when to probe and when to accept. Pressures placed on students in using this technique can be positive or negative depending on the emotional qualities and resources of the student. While students in the present study did not display evidence of emotional problems, a high level of frustration was expected at times due to task frequency and complexity. Not all students wanted to participate. The keen judgement of instructors was necessary to judge appropriate times to give the student space and time to think through a situation.

Appendix G contains the package of materials developed for Learner Strategies Enabling Thinking Procedure.

Time Frame

Both interventions were undertaken immediately following assessment. All training took place within a one week period over three days with a seventy minute period each day. While this is a lenghly time period covering two typical class sessions, the time was necessary to complete the task. A break of up to five minutes was available at the end of the first thirty-five minute period. Following the completion of training a criterion passage and comprehension questions were administered. In the event that the criterion of 80% success was not reached, further training would be conducted. It is interesting to note that all but one student reached criterion on their first attempt. The criterion passage and comprehension questions are found in Appendix H. A second criterion passage was available if required. Follow-up assessment took place in the following week such that all post intervention assessments began within a two-day period of the intervention.

Instructor Backgrounds and Training of Instructors.

A range of backgrounds was obtained in the instrucional group. Included in the group of five was an unemployed teacher with approximately twenty years experience, two retired teachers (1 male, 1 female) with approximately thirty years experience each, one housewife with a high school education and the author who had approximately twelve years experience in teaching, psychology and administration. The housewife was included for two reasons. One reason related to a difficulty finding trained teachers with the time to participate in the study. A second reason related to the desire to determine whether any differences would take place between persons trained and experienced in education versus a person without such a background. The remaining three instructors held Bachelor level training. Two had secondary level teaching experience, while the third had elementary level experience. Table V provides a summary of this information. These additional instructors were utilized to provide increased ecological validity and to provide some methodological insights into the training necessary to implement the instructional techniques.

While many classroom teachers aim at delivering both a "product" and a "process" oriented curriculum, the reality is that their education and professional training were very much "product" oriented. For many, introduction to cognitive problem solving strategies implies an intensive unlearning process. Hence the necessity of teacher in-service to assist teachers to effectively and efficiently utilize the techniques that only have begun to be outlined in cognitive models such as LSET and SIT. Sabatino et.al. (1981) stated that in their opinion a serious breakdown in training for content acquisition is occurring in the middle and secondary schools. Indeed, Bruner noted such a failure while evaluating the state of American education and endorsed the need for meta-cognitive education on all levels. In addition, he recognized the fact that the key for the successful incorporation of such a program would require an improved and revised teacher training procedure (Hall, 1982).

In-service was aimed at ensuring an understanding of the model, its intent and its application. From there, teachers need time to practice, modify, refine and become comfortable with their own specific teaching procedures. This cannot be imposed. It can be reinforced, clarified and

Table V
Background of Instructors

Instructor	Teaching Exper.	Education	Current Status
1	0	Grade 12	Housewife
2	30	Bachelors	Retired
3	20	Bachelors	Unemployed
4	30	Bachelors	Retired
5 (Author)	12	Ph.D. Coursework	Student

refined in an environment of mutual respect much as the instructors' classroom is intended to be.

Therefore, all instructors received approximately five intensive three-hour sessions involving training and practice in both SIT and LSET procedures. As well, all instructional sessions were audio-taped and monitored by the author. Meetings were held following and preceeding each instructional session to ensure compliance with established procedures.

It is important to note that all instructors were trained in collaborative interview techniques as outlined by Gorden (1980). This training was utilized to facilitate the establishment of rapport between the insturctor and the student and to facilitate enhanced openess on the part of students.

Directions for the administration of each of the reading passages are presented in Appendix G. Because five instructors were involved in the administration of the passages, several training sessions including colleague practice were utilized. None of the instructors began assessment until competence was achieved. As well, all sessions were audio recorded and monitored by the author. Follow-up meetings were held three times a week to discuss progress and issues.

G. Peer Teaching

With the completion of the training and post intervention assessment, students were requested to volunteer to teach a younger student at L.Y. Cairns School.

The purpose of this activity was to determine the nature and extent of strategy maintenance and transferability following training. As well, a secondary purpose was to determine whether or not any other strategies would emerge on the part of the student who was to act as teacher.

A reading passage at the reading level of the younger confederate was selected. The passage was reviewed with the student teacher to ensure familiarity with all the words. However, no other discussion of the passage was undertaken. The purpose of the procedure was explained to the younger confederate and to the parents of the younger student.

The student as teacher was asked to review the passage with the younger student so that the younger student would be able to tell what the passage was about following completion of the instruction. No other directions or instructions were provided to the student as teacher. All sessions were videotaped for analysis.

H. The Post Collaborative Interview

With the completion of the entire study, a psychologist who had been familiar with the study design, materials, purposes, limitations, setting and the nature of the students conducted a de-briefing session with the students. The purpose of the de-briefing was to review what had taken place in the study; to gather student perceptions of the assessments, the instructors, and the intervention; to gather student suggestions for refinement to the study and to ascertain the nature of follow-up the students may desire or require. An external person was used in an attempt to ensure enhanced openness on the part of the students regarding the study. This session was video-taped for analysis.

I. Data Analysis

Strategy Assessment

A rating sheet was devised to record the presence and incidence of strategy use by the students (see Appendix I). The author reviewed all audio and video-tapes three times. During the first session, a scanning procedure was used to determine the nature of the content of the tapes. In the second review, a careful analysis of presenting strategies was used to verify the nature and extent of strategies. The third review session was used to verify the nature and extent of strategies identified in the second review session.

In addition to the review of strategies by the author, two additional persons enrolled in the Ph.D. program in Educational Psychology at the Univesity of Alberta were employed to review a randomly selected portion of the tapes. Both persons were familiar with strategy assessment procedures. Raters were asked to review the tapes blind to gather their own perceptions on the existance of strategies. None of the raters were informed as to the nature of the group to which any particular student belonged. Prior to the second review by raters, a session was held to clarify any questions the raters may have.

The purpose of rater review was to ensure the consistency of rater judgements. Of the 103 audio-tapes, a random sample of 50 were reviewd by one colleague. A second colleague reviewed a random sample of 17 tapes, ten of which were the same as those reviewed by the other raters. Inter-rater reliability indicated a high degree of consistency between the raters regarding perceptions of the existance of a strategy. In fact, an approximately 98% agreement rate was found with differences taking place in the frequency of strategies rather than in the type of strategies. Where the small degree of disagreement did take place, discussions between the raters resolved the differences.

The same procedure involving two raters was used in the analysis of the video-tapes.

Analysis of Individual Performance

Because this was designed as an exploratory study, it is important to understand the effect of the assessment and intervention procedures on individuals. The concept of clinical significance has been used to denote the effects of an intervention on a single person (Hugdahl and Ost, 1981). With regard to reading comprehension this has been defined as a gain of 4 months or more, typically representing a change of 5 in the raw score which is approximately two thirds of a standard deviation. As far as other measures were concerned and for the purposes of this study, clinical significance was considered to exist if the raw score changed by 3 points on scrambled sentences, 10 points on the teacher rating scale and 15 points on the cloze passages. These calculations represent movement of one third of the total score on scrambled sentences, one categorical change on the teacher ratings and approximately 15 percent on the cloze passages (based on pilot study findings). As well, as noted by Hugdahl and Ost (1981), clinical significance is a matter of professional judgement within pre-established guidelines.

While attempts were made to create a homogeneous group for study, it was found that in fact the group was very heterogeneous on the variables to be studied. Coupled with the small number of students available for study, the within-group variability which would be present in any group of students would make the valid interpretation of results difficult (Bricker and Littman, 1982). For example, while the students formed a tightly cohesive group on IQ and reading achievement scores, a wide range of prevailing strategies existed on the aloud pre reading strategy assessment. There was no way of predicting this with any degree of confidence prior to beginning the study with the result that random assignment to instructors had been completed. Further, it was held that the key to the intensive collaborative relationship between student and instructor and the avoidance of creating the student perception that this was another rote study using students as subjects was sufficiently important to require that instructors and students begin to work together quickly. This resulted in instructors collecting all the data.

Another reason for using intensive individual analysis relates to the fact that sometimes averaging results may obscure meaningful individual variations (Glass et.al., 1975). Even if an experimental group performs statistically better than a control group, it is possible that some individuals have not changed, or may have deteriorated (Leitenberg, 1973). In applied settings decisions on which intervention is best suited to a specific individual is of particular importance. However, with group averages, one is unable to hypothesize which individual characteristics may be correlated with improvement or deterioration (Brinbrauer et.al., 1974).

Use of an intensive analysis of individual students also enable an easier determination of the magnitude of an observed change. This determination facilitates a decision as to whether the intervention has any clinical significance (Gottman, 1973).

Therefore, the performance of each student will be documented and plotted to enable both a visual and qualitative analysis of strategy existence, use and change as a result of intervention. Procedures borrowed from ethnography and qualitative research (Goetz and Le Compte, 1984) involving comparing, contrasting, aggregating, ordering and synthesis constitute the main process of data analysis in the present study.

J. Statistical Analysis

Because of the small number of students and the heterogenity of the sample, the results of the statistical procedures may be considered to be somewhat suspect. However, by making several assumptions outlined below, some statistical procedures were completed to determine whether any interventions showed statistical as well as clinical promise.

As well, analysis of the number of strategies generated is somewhat meaningless without a consideration of the quality of those strategies. However, some statistical procedures utilizing raw score data on the standardized reading tests, the results of correct responses in the cloze passages, the results of items correct on scrambled sentences is possible. While a statistical analysis of the number of correctly selected idea units was also possible, this task was so difficult and frustrating for students as not to warrant statistical analysis.

Because of the small number of students in the study, an analysis of the interaction between trainers and treatment was not possible. However a one-way analysis of variance was completed to determine whether or not a significant difference existed between the trainers on all the variables that provided quantitative data. As well, a two-way analysis of variance using repeated measures was performed to determine whether or not a significant difference existed among the interventions. This analysis was repeated for each quantifiable dependent variable. The Scheffe (1959), a more rigorous procedure, was used to test the significance of comparisons.

The correlation of variables such as locus of control, intelligence, reading level, strategy production and teacher ratings, was included to determine whether any of the variables were correlated. Pearson Product Moment Correlation coefficients of the variations of each group and the significance levels were calculated.

Decisions Based on Multiple Sources of Data

It is important to note that while a number of limitations are evident in exploratory research as outlined in the following section, this study utilized a triangle cross-reference approach to verify findings. For example, data gained from introspective and retrospective student reports was confirmed by direct behavior observation and by test scores on the same or related instruments. Specifically, in the case of the cloze procedure, the student who reported re-reading the first paragraph and using a word in line three would have been observed and audio-taped while doing that. As well, the actual answer sheet would be available to examine.

K. Limitations

1. This research was limited to the educable mentally handicapped adolescents enrolled during the academic year 1982-83 in L.Y. Cairns School within the Edmonton Public School District, Edmonton, Alberta. The study was also limited to those students who receive parental permission and were willing to participate in the research. Therefore , the sample may not be representive of the population being surveyed .
2. Students may have known they were participating in a research project. As well, all students received pretesting. It is not known what effects these factors

had on the results of the study.

3. Assessment devices covering comprehension monitoring lacked empirical support, particularly in their use with special populations such as EMH adolescents.
4. For the most part, SIT and LSET was compared relative to their effect on the participant rather than as compared to each other. As such, no definitive comments concerning effectiveness of one technique over the other can be substantiated. This was an exploratory study to determine initial impact and methodological needs for further detailed analysis and for the matching of technique with learner as suggested by Craighead et.al. (1978) and Meichenbaum (1979). Both Feuerstein et.al. (1979) and Meichenbaum (1979) have noted, the the need for long term training to observe an impact on cognitive/metacognitive skills. Nevertheless, some general trends were open to observation.
5. Genert and Turk (1981) have summarized the limitations of cognitive data such as self-reports. Such reports may be incomplete, reactive to the perceived environment, inconsistent with behavioral observations, idiosyncratic and biased by investigator interpretation. However, Ericsson and Simon (1980) have concluded that verbal reports elicited with care and interpreted with full understanding of the circumstances under which they were obtained are a valuable and reliable source of data, particularly if collected concurrently with other

records of behavior. This issue was discussed more fully in Chapter II.

6. Because a strategy may be so well known and utilized, its use may have become so automatized that it was not within the conscious control of the student and therefore not subject to a verbal report. Brown (1980) has suggested that ingenuity regarding the assessment of reading comprehension strategies was necessary in order to obtain a precise knowledge of the component processes in reading. Therefore students in the study were requested to instruct a younger student at the school who was a confederate of the author.
7. A related limitation to number 5 and number 6 involves the language ability of the student. Specifically, educable mentally handicapped adolescents may not have the ability to verbalize their inner thoughts. While there is some debate over the influence of language on reading, support for the positions of Huey (1908), Vygotsky (1962) and Kline and Kline (1975) that there is an *internal representation* or *inner speech* that is central to the comprehension of a written message is growing. Further, based on the work of information processing theorists, it was held that being able to receive and interpret information does not necessarily mean one can express that information (Bruner, 1966). It was hoped that by observing the students' actions, their written responses and noting the observations of their

teachers along with the verbal responses of the students, the resulting data triangle would enhance confidence in the findings. As well, the use of a clinical interview format (Gorden 1980), should facilitate a collaborative relationship effecting an openness on the part of participants.

8. The assessments, particularly the think aloud procedures, may lead to learning above and beyond the strategy training. Specifically, think aloud procedures may have enhanced a focussing of attention. However, the assessments should be included as a part of the SIT and LSET match of learner and technique. As such, any improvements would be expected to continue in all situations in which these paradigms were appropriately applied. As well, some indication of the effect of the think aloud procedure would be possible due to the comparisons between pre aloud and aloud pre measures.
9. Students were asked to read carefully because the passages would be discussed upon completion. This message was given in an attempt to ensure some degree of care in reading. While the direction was intentionally ambiguous and subject to interpretation in order to elicit more typical reading comprehension strategies, it may have added to the heterogenity of the sample in that the noting of what is important to remember was dependent upon each student's subjective interpretation of the criterion.

IV. RESULTS AND ANALYSIS

The results of the study are presented in graphic form along with a qualitative description of the nature and progress of each student. No outstanding physical, sensory, emotional, social or cultural characteristics were uncovered in a review of student records or through discussions with the school counselling staff.

The qualitative and graphic review of individual students is followed by a summary of information obtained from the attempts by students on the main idea passages, the final interview and the peer teaching. The idea units are reported separately because of the extreme frustration the task caused students, resulting in a discontinuation of this aspect of the study. Peer teaching and the final interview were combined due to the low number of students who participated. The final section provides a synthesis of the data to answer the research questions. It incorporates an analysis of the quantitative data gathered in the study.

A. Qualitative Summary

In order to facilitate the organization of the data for the reader, the qualitative summary of events by student has been grouped according to the nature of the intervention beginning with the control group and concluding with the self instructional training group. Scores for the Stanford Diagnostic Reading Test, the scrambled sentences and the cloze passages are contained in Table VI, with scores for the IAR, the Rotter and the teacher ratings contained in Table VII. The order of presentation is for organizational effectiveness and does not represent the order of passage in the study. While satistical analysis was computed using raw scores for all quantifiable data, the results of the Stanford Diagnostic Reading Test were reported in this section as grade equivalents as an aid to conceptualizing standing. Due to the limitations of discussing grade equivalents, clinical significance for the qualitative summary, while presented as a gain or loss equivalent to a .4 or greater grade equivalent, is based on a change of 5 in the raw score, which represents approximately two thirds of a standard deviation

Control

Student One

This 18.6 year old female was in her fifth year of a six year program at L.Y. Cairns. Following random assignment to the control group, she worked with instructor 4 (the male unemployed teacher) during the study. Student one had a full scale intelligence quotient of 70 on the WISC-R. With the exception of the idea unit passages she completed all tasks required of her in a positive manner. She was unavailable for the video-tape and final interview due to illness. Because school was closing a subsequent meeting could not be arranged.

Stanford Diagnostic Reading Test-Brown Level

Student one did not demonstrate any change between the pre and post testing on this measure. Her grade equivalent on auditory volcabulary was approximately the same on both measures. On the comprehension subtest no significant change was observed (see Table VI).

Table VI
Intelligence Quotients; Pre and Post Reading Scores On The Stanford Diagnostic Reading Test - Brown Level And Pre Aloud, Aloud Pre ad Aloud Post Scores On Scrambled Sentences and Cloze Passages By Students

Student	IQ	Reading Grade Equivalent		Scrambled Sentences			Cloze		
		Voc. P* P**	Comp. P* P**	Pre	A Pre	A Post	Pre	A Pre	A Post
Control									
1	70	4.9-5.0	4.4-4.5	3	2	8	16	15	33
11	70	5.6-6.0	5.4-5.9	5	5	3	34	54	62
12	64	4.9-4.1	4.4-3.6	2	1	2	24	36	15
13	70	5.1-5.2	4.4-4.5	3	2	6	26	34	53
15	70	5.6-5.0	5.1-4.6				58	70	57
Average	68.8	5.2-5.1	4.7-4.6	3.3	2.5	4.8	31.6	41.8	44
LSET									
2	70	5.4-5.5	4.9-5.6	9	9	9	39	44	71
4	70	5.1-5.2	4.5-4.1	0	2	5	25	16	38
5	70	5.1-5.2	5.2-5.6	7	4	7	39	48	71
6	67	5.1-5.0	4.5-5.1	5	6	6	13	17	41
9	70	4.7-5.0	4.5-4.8	5	6	8	32	34	45
Average	69.4	5.1-5.2	4.7-5.0	5.2	5.4	7	29.6	31.8	53.2
SIT									
3	67	5.6-5.5	4.2-4.3	0	1	4	19	25	40
7	69	4.7-4.8	4.4-4.9	1	5	5	18	38	43
8	61	4.7-5.0	4.4-4.8	1	3	6	14	36	53
10	60	4.2-4.1	4.4-4.3	0	2	5	10	18	23
14	68	4.4-4.1	4.5-3.4	2	0	0	6	22	29
Average	65	4.7-4.7	4.4-4.3	0.8	2.2	4	13.4	27.8	37.6
Range	60-70	4.2 4.1 -5.6 6.0	4.2 3.6 -5.4 5.9	0-9	0-9	0-9	6-58	15-70	15-71
Overall Avg.	67.3	5.0-5.0	4.6-4.6	3.1	3.4	5.3	24.9	33.8	44.9

P* = Pre
P** = Post

Table VII
Pre and Post Teacher Ratings
and
Locus of Control Measures Using the IAR and Rotter

Student	Teacher Ratings		L O C U S	O F	C O N T R O L	
			I A R			Rotter
	M	LA	t	-	t	
	P* - P**	P* - P**	P* - P**	P* - P**	P* - P**	P* - P**
Control						
1	20 - 20	32 - 32	14 - 13	9 - 8	23 - 21	14 - 16
11	35 - 30	43 - 28	10 - 9	11 - 9	11 - 19	18 - 21
12	33 - 28	30 - 22	5 - 5	10 - 9	15 - 14	18 - 20
13	39 - 37	30 - 30	14 - 13	13 - 13	27 - 26	10 - 10
15	35 - 38	50 - 50	16	15	31	5 - 3
Average	32.4 30.6	37 32.4	11.2 10	12 9.7	23.6 19.8	13 13.8
LSET						
2	50 - 30	34 - 16	10 - 12	10 - 11	20 - 23	10 - 9
4	30 - 28	34 - 32	12 - 14	10 - 12	22 - 26	12 - 15
5	39 - 37	35 - 22	13 - 15	9 - 10	22 - 25	18 - 16
6	37 - 20	48 - 22	14 - 17	14 - 15	28 - 32	14 - 12
9	37 - 32	45 - 20	16 - 16	13 - 14	29 - 30	16 - 12
Average	38.6 29.4	39.2 22.4	13 14.8	11.2 12.4	24.2 27.2	14 12.8
SIT						
3	26 - 20	36 - 20	14 - 11	12 - 11	26 - 22	12 - 9
7	30 - 25	27 - 20	10 - 10	11 - 11	21 - 21	18 - 18
8	31 - 30	34 - 34	11 - 11	11 - 11	22 - 22	16 - 14
10	23 - 23	23 - 23	12 - 13	8 - 9	20 - 22	18 - 21
14	35 - 38	38 - 36	10 - 13	10 - 8	20 - 21	6 - 5
Average	29 27.2	31.6 26.6	11.4 11.6	10.4 10	21.8 21.8	14 13.4
Range	20 20	27 20	5 5	8 8	15 14	5 3
	50 38	48 36	16 17	15 15	31 30	18 21
Overall Av.	33.3 29.1	35.9 27.1	12.1 12.2	11.1 10.8	23.2 23.1	14.6 13.4

P* = Pre
P** = Post
M = Math Teacher
LA = Language Arts Teacher
IAR = Intellectual Achievement Responsibility Questionnaire
Rotter = Rotter Internal-External Control Scale

Locus of Control Scales

Student one did not demonstrate any real changes from pre to post or either the IAR or the Rotter Scales. On the Rotter, in both pre and post conditions student One tended not to accept self responsibility for global outcomes (see Table VII). On the IAR in both pre and post measures, Student One tended towards accepting self responsibility for academic success, but not for academic failure. In total, the results of the IAR indicated that Student One tended more towards accepting self responsibility for academic achievement (see Table VII).

Teacher Ratings

Ratings by her math teacher in pre and post conditions were highly consistent indicating that in mathematics, Student One tended to be focused, to pay attention to detail, to be organized and to proceed in a systematic manner. However, the ratings by her language arts teacher in both pre and post conditions tended to mirror those in the math class indicating a lack of attention to detail, a failure to focus, and an inability to use precise language in explaining events (see Table VII). This difference may be due to the different requirements of the courses.

Introspection Passages

During the pre intervention measure few strategies emerged. It appeared that Student One would read the passage stopping for a brief time at the dot. When she stopped she simply restated the line she had just read. However some attempt at interpretation was made. The interpretations were very concrete in nature and did not go beyond the information given. In response to retrospective questioning, Student One stated that she did read ahead silently. However, behavior observation did not confirm this, nor was a scanning ahead feature confirmed. The lack of focus, clarification of directions and clearness of verbal responses reported by her language arts teacher were confirmed.

In the post intervention measure, the use of interpretations decreased slightly (see Tables VIII and XI). Clarity of expression was still lacking. As well, interpretations remained concrete in nature. A tendancy towards trying to understand what the passages were about emerged in two of the three passages. However, this was not well established.

Scrambled Sentences

The scrambled sentences did not reveal many clear strategies for arranging items in the correct order. Rereading or restating seemed to be the most prominent method used in the pre aloud, aloud pre and aloud post conditions. The student did not volunteer a lot of information nor did she expand upon her reasons during retrospective questioning.

Fig.3. Performance of Student 1 on Scrambled Sentences

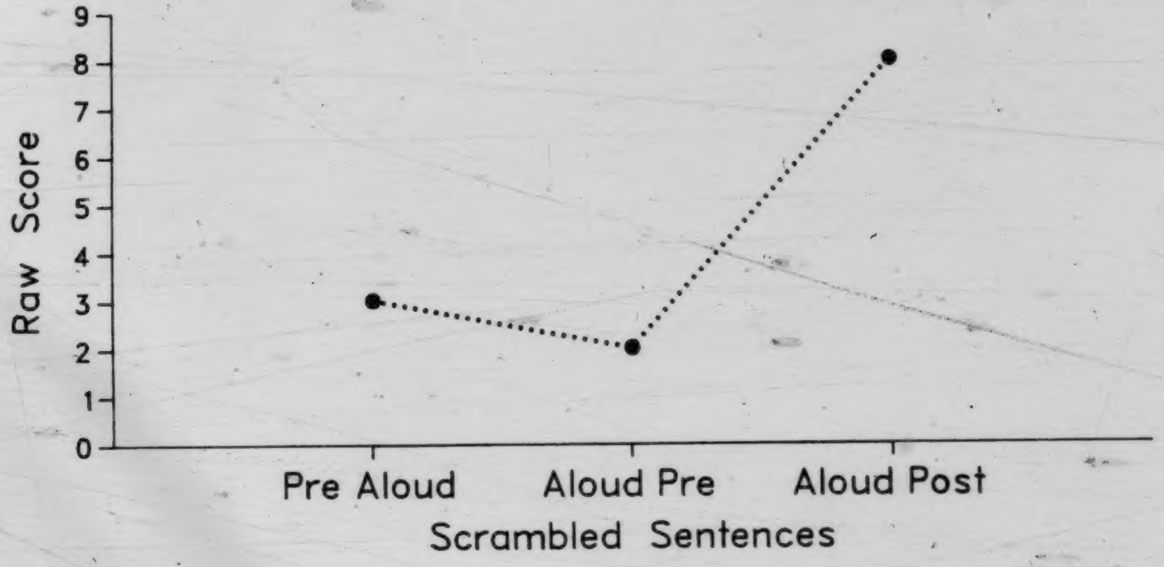


Fig.4. Performance of Student 1 on Cloze Passages

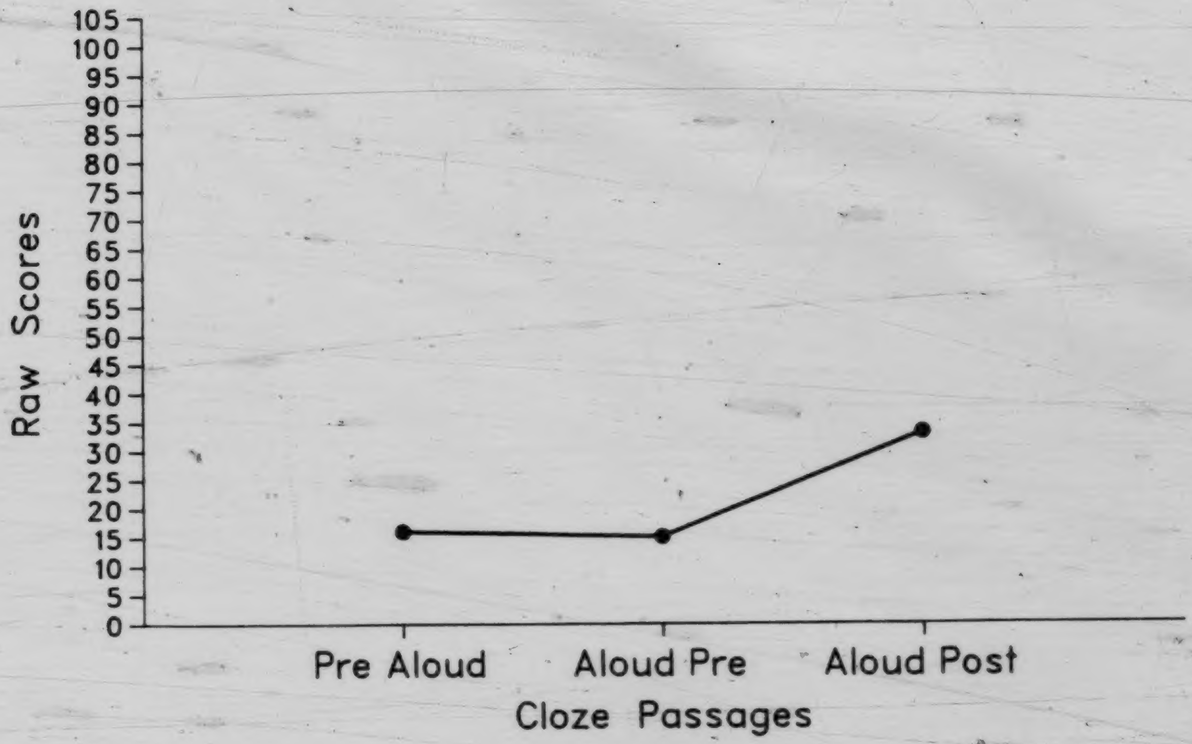


Figure three demonstrates the preformance of Student One on scrambled sentence completion. As indicated a slight decline in performance took place with the addition of think aloud in the pre condition. However, a clinically significant improvement took place in the aloud post condition. Since no related intervention took place it is difficult to explain this gain. Perhaps it was related to practice since the effect was seen in all students in the control group.

Cloze Passages

When presented with the first cloze passage in the pre aloud condition, Student One sat quietly for about two minutes before beginning. For a while, as time went on, she became more content with the work and appeared to enjoy the stories. However, towards the end of the aloud pre condition and during the aloud post condition, she became more and more frustration. While fatigue with the exercise may have been a factor, it was conclued that a real reason may have been the perception that all that was being done was trying out various measures without providing any active instruction beyond the classroom. During the aloud post condition, Student One stated she not want to continue. However, as a result of the rapport between the student and her instructor she agreed to continue. Indeed, the expression of the wish to stop seemed to have lessened the frustration with continuing.

The strategies that emerged in both the aloud pre and post conditions included rereading and restating the word immediately preceeding the blank as a clue. Questioning for the reasons for selecting a word frequently elicited the statement that "it sounds right" or "I don't know...it just popped in my head." As with the introspection and idea unit passages little interpretation of events was made. When an interpretation was attempted, it was very concrete and tied to the passage.

The instructor noted that the student frequently lost track of her place on the page and would read or jump ahead loosing her concept of the passage. On one occasion she questioned herself as to the location on which she was reading. Frequently she had to go back and reread several lines to understand and regain her place. This confirmed her lack of consistent focus and lack of organization in work as noted by her language arts teacher and during the introspection responses. However, Student One exhibited a great deal of perseverence in all tasks.

A review of Figure IV indicates little difference between aloud pre and pre aloud conditions, but a sutstantial gain on the aloud post measure.

Student one was not available for the video tape or the final interview.

Student Eleven

This 18.2 year old male student worked with instructor 3 (the female retired teacher) during the study. Assigned to the control group, Student Eleven had a full scale IQ of 70 on the Wechsler Intelligence Scale for Children-Revised. With the exception of the idea unit passages, he completed all the assigned tasks in the study. While expressing fatigue with the process this student was cooperative. As well, a positive pleasing manner emerged throughout the sessions.

Stanford Diagnostic Reading Test-Brown Lord

A slight gain in reading scores was observed in both vocabulary and reading comprehension between the pre and post assessment (see Table VI). The slight change was not considered significant given the predetermined decision rule.

Locus of Control Scales

While a strong change in pre-post measures on both locus of control scales was not observed, there was a slight tendancy toward a greater emphasis on non acceptance of self responsibility for global outcomes as measured by the Rotter. However, responsibility for academic achievement was recorded on the IAR (see Table VII). This difference was attributed to the large standard deviation in both instruments.

Generally, Student Eleven tended to perceive external events as being the determinants of outcomes. This tendency was strenghtened in pre to post assessments. As well in both pre and post conditions, student eleven did not tend to accept self responsibility for successes (see Table VII).

Teacher Ratings

Ratings by his math teacher indicated that in both pre and post conditions, Student Eleven tended to lack a focus, did not attend well to detail and did not appear organized or to proceed in a systematic manner in problem solving (see Table VII). The language arts teacher confirmed and strengthened this finding in the pre rating. However, a clinically significant change was reported by the language arts teacher in the post rating with a 15 point improvement being earned (see Table VII). The teacher reported enhanced attention while directions were given as well as an increased ability to focus and communicate.

Introspection Passages

During the aloud pre measure several strategies emerged and were confirmed in the aloud post measures. As well, it became evident that Student Eleven did exhibit comprehension monitoring in that the student would make statments such as "Let's see, this one is about...I think it would be...," Another example was "This is much harder than the first one." However, strategies to assist in monitoring were not fully developed. During the passage on quicksand, the student stopped about two thirds through the story and quesitoned himself whether or not the passage was contradicting something he had read earlier. He then looked back, but had trouble locating the exact position of the idea and lost his flow of thought. In the story on the beavers he hypothesized that something would happen, but did not verify whether the hypothesis was true (see Table VIII). As well, during the story on the CPR he commented, "This is going to be a hard one". At the end of the fist paragraph he confirmed it was hard.

Student eleven frequently made interpretations about and comments on what he was reading. These were often inaccurate or related to personal experiences that detreacted from understanding of the passage. Indeed, he often would continue explaining the personal experience forgetting about the story. While personal experience may be a strategy to assist in understanding a story, for student eleven, the strategy impaired understanding. Difficulty with abstrating information and or a lack of basic information such as knowing East and West directionality also interferred with his comprehension of some stories.

Other strategies that emerged included attempts to understand the main theme of the story, to use visual imagery, and to ask the instructor. However, with the exception of questioning the instructor, difficulties emerged in each case.

No real differences in the types of strategies emerged between aloud pre and aloud post. However, the quantity of and confidence in the use of some strategies did increase (see Tables VIII, XI, XII, and XIII). As well, his use of guessing ceased. This may have been what led to the perceived change in the teachers rating of the student's strategic approach to academic problems in language arts.

Scrambled Sentences

Student eleven completed the shorter scramble sentences very quickly, but was slower completing the 7 sentence items. Frequent comments to himself were made. Examples include: "Wow! I'm mixed up." and "Good! This is getting better." and "Ah! Let's see now?"

His most prevelant approach and strategy to arranging the scrambled sentences was to read, restate, interpret in a concrete way, organize and reread the sentences (see Table VIII).

No differences between pre aloud and aloud pre emerged. However, a decrease in performance took place from aloud pre to aloud post (see Figure V).

Cloze Passages

The instructor observed an interesting characteristic regarding the reading rate of Student Eleven. While reading aloud, the student completed the passages much more quickly

Fig.5. Performance of Student 11 on Scrambled Sentences

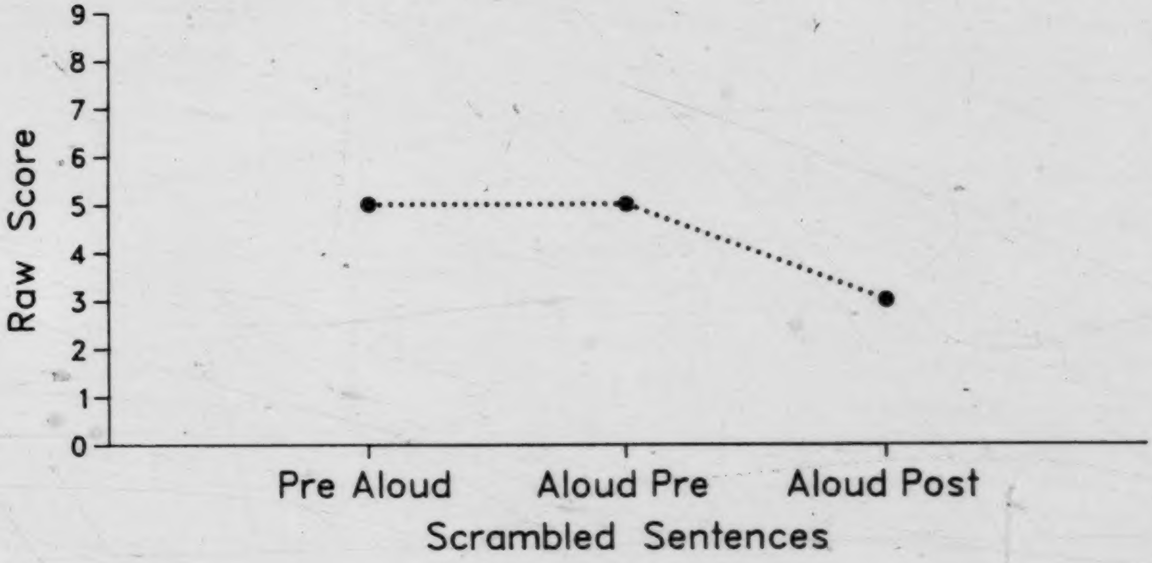
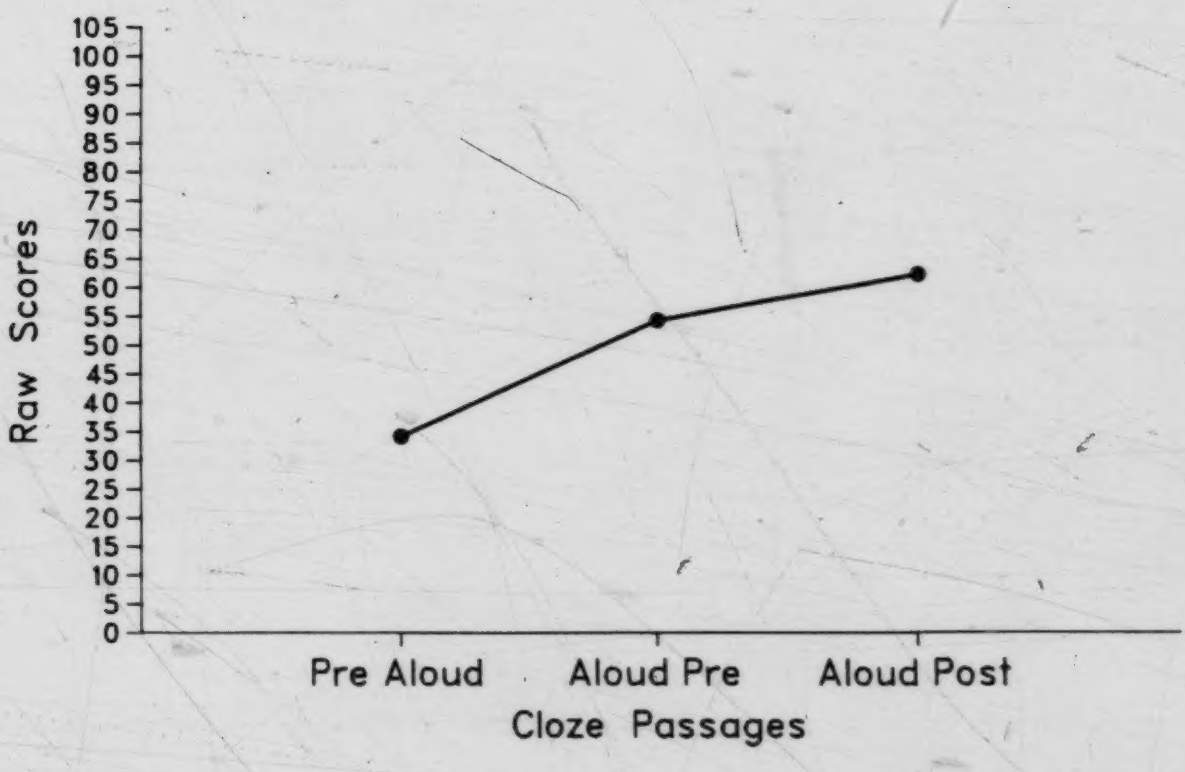


Fig.6. Performance of Student 11 on Cloze Passages



and with greater accuracy than when reading silently under the pre aloud condition. It would appear that reading aloud and thinking aloud improved performance and rate (see Table VI). It may be that for this student, think aloud provided a performance aid to task completion.

As with the introspection and scrambled sentence passages, Student Eleven demonstrated monitoring of his performance. Evidence of this was based on commens such as "Wait, this looks wrong back here, it should be "food" 'cause its down here, right?" Then he would return and correct the word. Indeed, he appeared to have better success with doing this in the cloze passages than in verifying information in the introspection passages as evidenced in his improved performance. However, in about fifty percent of the cases he was unable to correct the word despite recognizing an error existed. This may have been due to a lack of vocabulary. As well, he was observed to change words that he could not spell substituting an incorrect word that he could spell. Eventually, he came to give the instructor the word saying he could not spell it. This took place following repeated suggestions by the instructor to undertake such an action.

The finding in the introspection passages that looking back caused a loss of place was also found in the cloze passages. Student eleven would not spontaneously scan a passage for fear of getting lost.

With the exception of an increased frequency of strategies and an improved "air of confidence" reported by the instructor, no differences in types of strategies between pre and post was observed. However, Student Eleven did not guess at answers in the aloud post condition. The types of strategies that emerged included rereading, questioning of self and the instructor, making interpretations, using logic, using the main idea or theme of the story, guessing, making inferences or suggesting hypotheses, and sensing the mood of the story. However, hypotheses and guesses were not verified as to correctness, interpretations were not verified, and rereading often caused a loss of place in the story.

Figure VI provides a review of the increases in accuracy from pre aloud, through aloud pre to aloud post measures. Differences may have been due to the increased attention and focus referred to by the language arts teacher. This may have resulted from an increased confidence in and resulting frequency of use of existing strategies, perhaps due to the think aloud procedure and practice.

Student Twelve

This 16.8 year old female with a full scale IQ on the Wechsler Intelligence Scale for Children-Revised of 64 worked with instructor 1 (the author) and was randomly

Table VIII

Strategies Utilized by Individual Students
By Treatment Groups on Pre Test Measures

Strategies	Control					LSET					SIT					Total
	1	11	12	13	15*	2	4	5	6	9	3	7	8	10	14	
Restatement	X	X	X	X						X	X		X			7
Recall						X										1
Read Ahead			X	X	X			X				X		X	X	7
Reread	X	X		X	X	X	X	X	X	X	X		X	X	X	13
Look Back		X	X													2
Scanning			X	X				X		X	X	X			X	7
Main Idea		X		X	X		X	X	X	X	X					8
Summarizing			X								X					2
Interpretation	X	X		X	X	X		X	X	X	X	X	X	X	X	13
Analogy									X							1
Hypothesizing		X	X	X		X	X	X	X	X		X	X		X	11
Hy. Verification										X						1
Questions Self		X						X	X			X			X	5
Questions Others		X	X	X				X						X		5
Personal Exper.		X			X	X		X	X	X		X				7
Logical Sequence		X		X		X					X	X			X	6
Sensing the Mood		X				X					X	X				4
Visual Imagery		X					X	X				X				4
Sound/Symbol															X	1
Semantic Cue			X	X		X		X			X	X	X	X		8
Syntactic Cue											X					1
Sounds Right	X			X			X	X		X	X	X	X		X	9
Makes Sense			X	X							X					3
Popped In Head	X						X	X		X	X	X	X		X	8
Guessing		X						X								2
Total	5	13	9	12	5	8	6	14	7	10	13	12	7	5	10	136
Monitoring		X				X									X	3
Concrete Thinker	X	X	X	X	X	X	X	X	X		X		X	X		12
Abstract Thinker										7						1

* Student 15 completed only Cloze Measures and 1 of the Introspective Passages

Table IX
Number of Students Using Strategies by Type of Assessment On Pre and Post Test Measures

Strategies	Introspection		Scrambled		Cloze	
	Pre	Post	Pre	Post	Pre	Post
Restatement	5	5	2	2	1	1
Recall	1	1	0	0	0	0
Read Ahead	4	2	1	0	4	11
Reread	3	6	8	9	8	10
Look Back	1	1	0	0	1	4
Scanning	1	2	2	2	5	8
Main Idea	1	7	4	4	4	6
Summarizing	2	2	0	0	0	4
Interpretation	11	12	4	5	8	7
Analogy	1	0	0	0	0	0
Hypothesizing	9	9	2	2	2	4
Hypothesis Verification	0	4	0	1	1	2
Questions Self	1	2	0	0	4	5
Questions Others	2	7	0	0	3	6
Personal Experience	4	4	0	1	6	6
Logical Sequence	0	0	5	5	2	3
Sensing the Mood	1	2	0	0	3	3
Visual Imagery	2	3	0	0	2	2
Sound/Symbol	0	0	1	2	0	0
Semantic Cue	1	2	3	5	4	3
Syntactic Cue	0	0	0	0	1	1
Sounds Right	1	0	4	5	9	5
Makes Sense	0	0	2	4	1	0
Popped Into Head	0	0	1	1	8	2
Guessing	0	0	0	0	2	2

Table X

Number of EMH Adolescents Utilizing Strategies
On Pre and Post Test Measures Across Treatments

Strategies	Control		LSET		SIT		Total	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Restatement	4	4	1	0	2	2	7	6
Recall	0	0	1	2	0	0	1	2
Read Ahead	3	3	1	4	3	4	7	11
Reread	4	4	5	5	4	4	13	13
Look Back	2	2	0	2	0	0	2	4
Scanning	2	2	2	3	3	3	7	9
Main Idea	3	3	4	5	1	4	8	12
Summarizing	1	1	0	1	1	2	2	4
Interpretation	4	4	4	5	5	4	13	13
Analogy	0	0	1	0	0	0	1	0
Hypothesizing	3	3	5	5	3	2	11	10
Hypothesis Verification	0	0	1	3	0	1	1	4
Questions Self	1	1	2	4	2	3	5	7
Questions Others	3	3	1	4	1	5	5	12
Personal Experience	2	2	4	5	1	2	7	10
Logical Sequence	2	2	1	3	3	3	6	8
Sensing the Mood	1	1	1	2	2	1	4	4
Visual Imagery	1	1	2	3	1	2	4	5
Sound/Symbol	0	0	0	0	1	2	1	2
Semantic Cue	2	2	2	5	4	1	8	9
Syntactic Cue	0	0	0	0	1	1	1	1
Sounds Right	2	2	3	3	4	1	9	7
Makes Sense	2	2	0	1	1	0	3	4
Popped Into Head	1	1	3	0	4	1	8	2
Guessing	1	1	1	0	0	0	2	1

Table XI
Strategies Utilized by Individual Students By Treatment Groups on Post Test Measures

Strategies	Control					LSET					SIT					Total
	1	11	12	13	15*	2	4	5	6	9	3	7	8	10	14	
Restatement	X	X	X	X							X		X			6
Recall						X										2
Read Ahead			X	X	X	X		X	X	X	X	X		X	X	11
Reread	X	X		X	X	X	X	X	X	X	X		X	X	X	13
Look Back		X	X						X	X						4
Scanning			X	X		X			X	X	X	X			X	9
Main Idea		X		X	X	X	X	X	X	X	X	X	X		X	12
Summarizing			X							X	X				X	4
Interpretation	X	X		X	X	X	X	X	X	X	X		X	X	X	13
Analogy																0
Hypothesizing		X	X	X		X	X	X	X	X		X			X	10
Hy. Verification						X	X	X							X	4
Questions Self		X				X		X	X	X	X	X				7
Questions Others		X	X	X		X		X	X	X	X	X	X	X	X	12
Per. Exp.		X			X	X	X	X	X	X		X	X		X	10
Logical Sequence		X		X		X		X			X	X	X		X	8
Sensing the Mood		X				X			X							4
Visual Imagery		X				X	X	X				X				5
Sound/Symbol												X			X	2
Semantic Cue			X	X		X	X	X	X	X	X	X				9
Syntactic Cue											X					1
Sounds Right	X			X			X		X	X		X			X	7
Makes Sense			X	X						X	X					4
Popped In Head	X											X				2
Guessing		X														1
Total	5	13	10	12	5	15	10	13	13	14	14	13	7	4	13	160
Monitoring		X				X	X	X	X	X		?	?		X	9
Concr. Thinking	X	X	X	X	X	X	X	X	X				X			10
Abstract Thinking										?						7

* Student 15 completed only Cloze Measures

assigned to the control group. While no outstanding issues emerged as a result of the cumulative file review and discussions with the counseling and school staff regarding emotional, cultural, sensory, physical or social characteristics, Student Twelve was very frustrated with the approaches used in the study. She reported that an earlier asthmatic condition reactivated itself during the study requiring medical attention. This caused her difficulty with the think aloud measures. Despite repeated positive offers to leave the study, she insisted on completing the measures but chose not to participate in the peer teaching and the final interview.

While no formal post interview was conducted, the instructor was able to arrange a spontaneous discussion after the completion of the data collection. Student twelve presented as a more relaxed individual, discussed the sessions positively and appeared to be better able to organize her responses. Her respiratory condition also had obviously improved.

Stanford Diagnostic Reading Test-Brown Level

Student twelve demonstrated a drop in achievement on both vocabulary and reading comprehension from pre to post. Her vocabulary score dropped 0.8 from 4.9 to 4.1 while her comprehension score also dropped 0.8 from 4.4 to 3.6. This may have resulted from a motivational factor, her health problem, her frustration with the study, a factor associated with the test format, or, it may have been her true test score. It is considered clinically significant (see Table VI).

Locus of Control Scales

Student twelve tended to perceive outcomes resulting more from external factors than self responsibility. This finding was consistent on both the Rotter and the IAR. On both tests there was some evidence of a small change toward internal factors from pre to post (see Table VII). An interesting finding was that she accepted greater responsibility for failure than for success. This was consistent in both pre and post conditions (see Table VII). This may have been related to her strong desire to complete the assessments fearing non completion would be a failure for which she was responsible. However, frequently she did not attempt an answer nor did she attempt to interpret a passage.

Teacher Ratings

Ratings by her math teacher indicated a tendancy toward non systematic behavior, a failure to focus and a failure to organize her work. Some improvement was noted from pre to post. Her language arts teacher perceived a similar approach. As well, improvement from pre to post was observed (see Table VII). Her failure to focus attention, to stop and think before acting also was observed by the instructor.

While the instructor did not observe any improvement, her math and language arts teacher did. She indicated having more trouble with math than with reading, although she reported she was worse than her peers in reading.

Introspection Passages

During the aloud pre and aloud post assessments, Student Twelve applied very few strategies in her reading. The few strategies that were used, were applied inconsistently. When Student Twelve came to a dot she would say "Period" and continue to read. Attempts at probing were unsuccessful. She indicated that she knew the dot was there to make her stop and think. However, she did not need the dot because she knew she was supposed to summarize what was said up to the dot. This direction had not been given to her. She stated she had never done anything like this before. She said she preferred to read on without stopping to think. However, she did periodically attempt a restatement of what was read. She explained she was summarizing what she just read. On one occassion, she asked the instructor what a word meant, then continued to read.

Scrambled Sentences

Her most common statement to questions regarding how she put the sentence together was that "it makes sense. I read it and it's obviously this way!" This reason was given whether the order was correct or incorrect. A review of Figure VII demonstrates that she got very few correct in either the pre aloud, aloud pre, or aloud post assessment conditions.

Cloze Passages

The cloze passages elicited a few more strategies than any of the other conditions. However, working on the passages lead to some conclusions regarding her performance. Student twelve was not very verbal. This was confirmed in instructor/student interactions, in observations of her with her peers, in a post study discussion and by her teachers. Also, the hypothesis that while accepting some responsibility for failure, she used failure avoidance strategies to get out of work was confirmed. When required to comnplete a task, she used a confrontational approach in her response. Whether right or wrong, she would make definitive statements indicating she was right, or "that's all that's needed," or "I know what's needed but I don't need to do that." In this way she took a proactive stance putting the onus on the other person to require a response. When pushed to respond she would state "it sounds right" or "it popped into my head." Requests for further clarification resulted in "I don't know" or "I went over it in my mind." Any other frequently used reason was that "it rhymes."

More positive strategies that did emerge in the cloze passage included scanning and reading ahead, some looking back, the use of a semantic cue, and some inferencing or

Fig.7. Performance of Student 12 on Scrambled Sentences

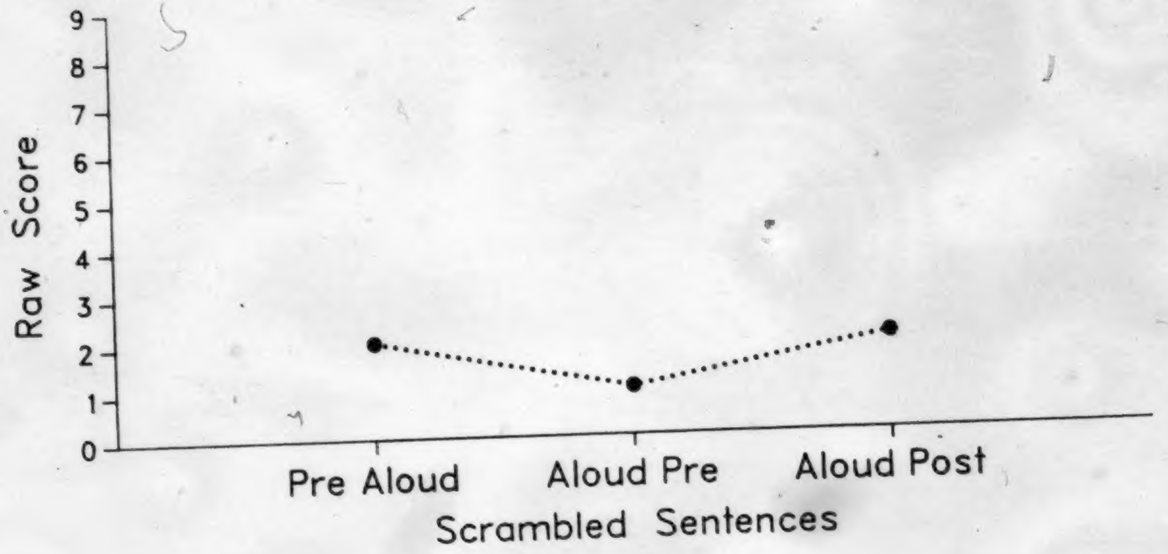
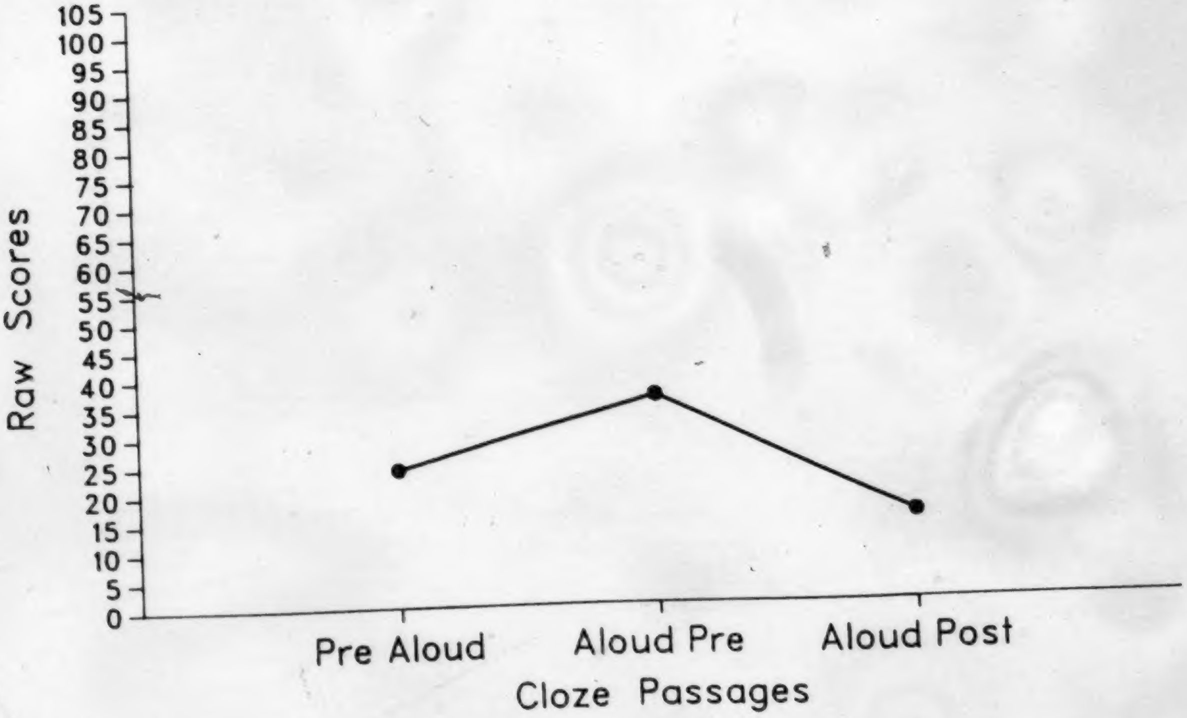


Fig.8. Performance of Student 12 on Cloze Passages



hypothesis formation. However, the hypotheses were not verified. For example, at one point she stated, "I bet those penguins are stupid", while in a second example she stated "Hm, the deer could be good to eat".

Accuracy in filling in the missing words indicated an improvement from pre aloud to aloud pre and a drop in performance on aloud post (see Figure VIII). The improvement may have been due to the read and think aloud procedure causing her to focus her attention. As well, it was observed that she took longer to complete tasks in the aloud pre condition than in the pre aloud contition. The drop in accuracy may have resulted from an attitudinal factor (she appeared negative towards the process), as a result of her health and the resulting decrease in encouragement to think aloud.

Authors Comment

In terms of Student Twelve, the results are confounded with a health problem, a potential attitudinal problem, and avoidance of being confronted with assessment in an area the student recognized as a difficuly for her. Despite extensive attempts to reassure student twelve, a real change in her relationship with the instructor was not evident until the study was completed.

Because the student was obviously bothered by the procedure, yet wanted to complete the process, the instructor did not probe responses to any great extent. Rather, time towards the end of the project was spent on discussions related to the positive aspects of her work. As well, the student was not encouraged to think aloud. This may have caused further confounding of her results. In any event, addressing the presenting situation was required. Discussions were held with her parents, teachers, the counsellor and the administration.

Involvement with this student, however, was revealing regarding the limitations of the procedures and contributed to the ecological validity of the study. This aspect is addressed more fully in Chapter V.

Student Thirteen

This 16.11 year old female with a full scale IQ of 70 on the Wechsler Intelligence Scale for Children-Revised was in her fifth year at L.Y. Cairns School. She worked with instructor 5 (the male retired teacher) and had been randomly assigned to the control group. With the exception of the idea units, the video tape and the final interview she completed all tasks positively and cooperatively during the study. She was unavailable for the video tape and the final interview due to leaving school early to travel with her parents.

Stanford Diagnostic Reading Test-Brown Level

A slight gain in her pre to post reading scores was observed in both vocabulary and comprehension (see Table VI). This gain was not considered clinically or statistically significant.

Locus of Control Scales

Student thirteen tended to accept more personal responsibility for outcomes affecting her. Her scores were within the higher range of average for persons of her age on the Rotter. Both pre and post measures were consistent. As with the Rotter, no changes of a clinical significant nature took place in the pre to post measures on the IAR scale (see Table VII). Student thirteen tended to accept an average amount of responsibility for her academic success and failure when compared to students of a similar age. However, it should be noted that the normative sample for the Rotter was composed of college students. The normative sample for the IAR was composed of normal achieving secondary school students.

Teacher Ratings

Once again, a high degree of consistency was found on pre and post ratings by both her math and her language arts teacher (see Table VII). Her math teacher tended to perceive her as lacking organization, failing to clarify directions, setting off without a plan and failing to focus her attention on the task at hand. This finding was the same in both pre and post conditions. To a lesser extent her language arts teacher rated her very much the same in the pre rating (30 of 50) and in the post rating (see Table VII).

Her instructor observed similar behaviour and indicated she did not appear to monitor her actions. However, she was quick to take cues from the instructor who had to hide the slightest hint of agreement with a response.

As well, Student Thirteen did not think out loud as spontaneously as some other students. She required many more prompts and responded with more insights to retrospective questions. This limited the validity of her results. With this caution it is important to note that as time progressed in the study, she became more open. This is rather interesting since time was spent with each student building rapport prior to beginning the sessions.

A final comment by the instructor which was verified by listening to the tapes and through discussions with her teachers was that she was a very slow methodical reader and speaker. Typically she required much longer to complete the passages than other students averaging 90 minutes as compared to 45-60 minutes on passages.

Introspection Passages

A number of interesting findings took place in these passages. While Student Thirteen appeared to be using the concept of main idea as a strategy in reading, questioning at the end of the session revealed that she could not describe the central or main concept or the intent of the story. For example, in the passage on whales, she could not grasp the point that whales are becoming extinct because they are being killed. She saw whales as a danger to modern man, a point not explicitly dealt with in the story. In another story dealing with the CPR she posed the question of why the railway was being built, a good comprehension strategy. Later when she read the answer, she did not integrate it with with her earlier question. Indeed, attempts by the instructor to indirectly and then directly draw this to her attention failed.

These examples point to a reason why simply providing a total number of strategies used is meaningless. It is the quality, use and competence with which the strategies are used that is important. This aspect will be discussed in the data synthesis section of this chapter.

Use of strategies such as interpretation and hypotheses generation were observed. However, they were not used appropriately nor were they verified by looking for further information in the passage or through questioning the instructor. In fact, the concept of what constituuted a hypothesis was not known by the student.

In several cases, passages were internalized and questions taken as though they were directed to her personally. For example, in response to the opening line in the passage on superstition which reads "Are you superstitious?", Student Thirteen asked her instructor, "Do I have to answer that?"

Another strategy that presented on one or two occasions included sensing the mood.

Scrambled Sentences

It was in completing the scrambled sentences that student thirteen's difficulty with thinking aloud became most obvious. As well, it was observed that she did not integreate concepts or materials well. For example, she would read the sentences in isolation, repeating them without attempting to see a relationship between them. This finding was reinforced by reports from her teachers.

The typical strategy used by Student Thirteen in sequencing was that restating what had been read.

It was during the scrambled sentence section that her reliance on instructor cues became obvious. For example, at one point the instructor asked her to provide him with some reasons for her sequence of a particular group because she had not verbalized her thoughts. Without speaking she immediately began to rearrange the units. It required three explanations by the instructor to convince her that nothing was wrong before she provided a response to his question and stopped trying to rearrange the cards. Her response was that the order "seems right." It was concluded that one of her strategies is to monitor her teacher's responses with the slightest question being interpreted as an indication of failure.

Student thirteen reported enjoying this activity despite an increasing failure rate with an increase in unit length. A review of Figure IX reveals a drop in success with the introduction of the think aloud procedure and an increase in correct responses in the aloud post condition.

Cloze Passages

The cloze passages elicited some of the same strategies as did the introspection passages. Included in the strategies identified in the cloze passage were rereading, used in just about all stories but lacked a high success; scanning forward, which was used about four times; reading ahead; use of logical order, which was used once in each of three passages; and frequent attempts at interpretation of the information. The most common response which was used in the case of twenty blanks was "it sounds right," "it seems to fit," or "it makes sense."

While a high level of consistency between aloud pre and aloud post measures existed, one passage in the aloud pre measure elicited use of a semantic cue (see Tables VIII and XI).

The presence of these strategies were verified by all three raters involved in the review of the audio tapes using the rater introspection sheet.

Accuracy in finding the missing word indicated improvement from pre aloud to aloud pre to aloud post (see Figure X). These improvements which were considered clinically significant, may have been due to the effects of the read and think aloud procedures. Another possibility is the effect of practice and procedure familiarity. A third possible explanation may have involved the growing level of relaxation and spontaneous responding exhibited by Student Thirteen as the study progressed.

Student Fifteen

This 16.7 year old male with a full scale IQ of 70 on the Wechsler Intelligence Scale for Children-Revised was in his fifth year at L.Y. Cairns School. He worked with instructor 2 (the housewife) and was randomly assigned to the control group. However, within two weeks of beginning the study, it became apparent that Student Fifteen wanted to finish school. As a result, he periodically left school for varying periods. He completed the cloze passages, Stanford reading test and the Rotter. In addition, the teacher rating scale was completed. It is interesting to note that while Student Fifteen wanted to leave school his relationship with the instructor was fairly positive.

Stanford Diagnostice Reading Test-Brown Level

A drop of 5 months was recorded in his pre to post auditory vocabulary scores on the Stanford Diagnostic

Fig.9. Performance of Student 13 on Scrambled Sentences

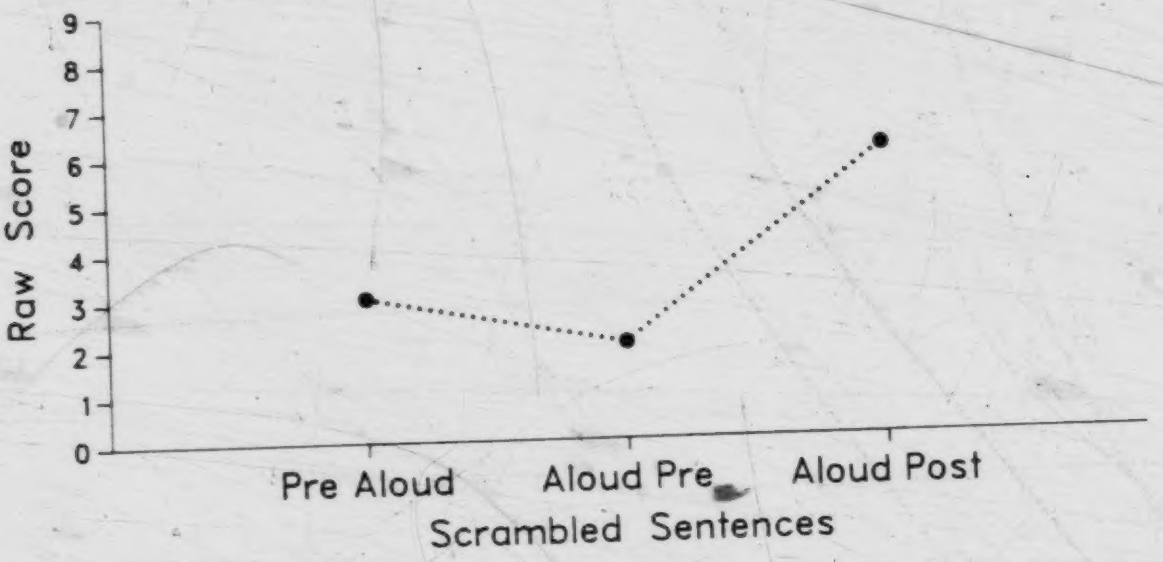
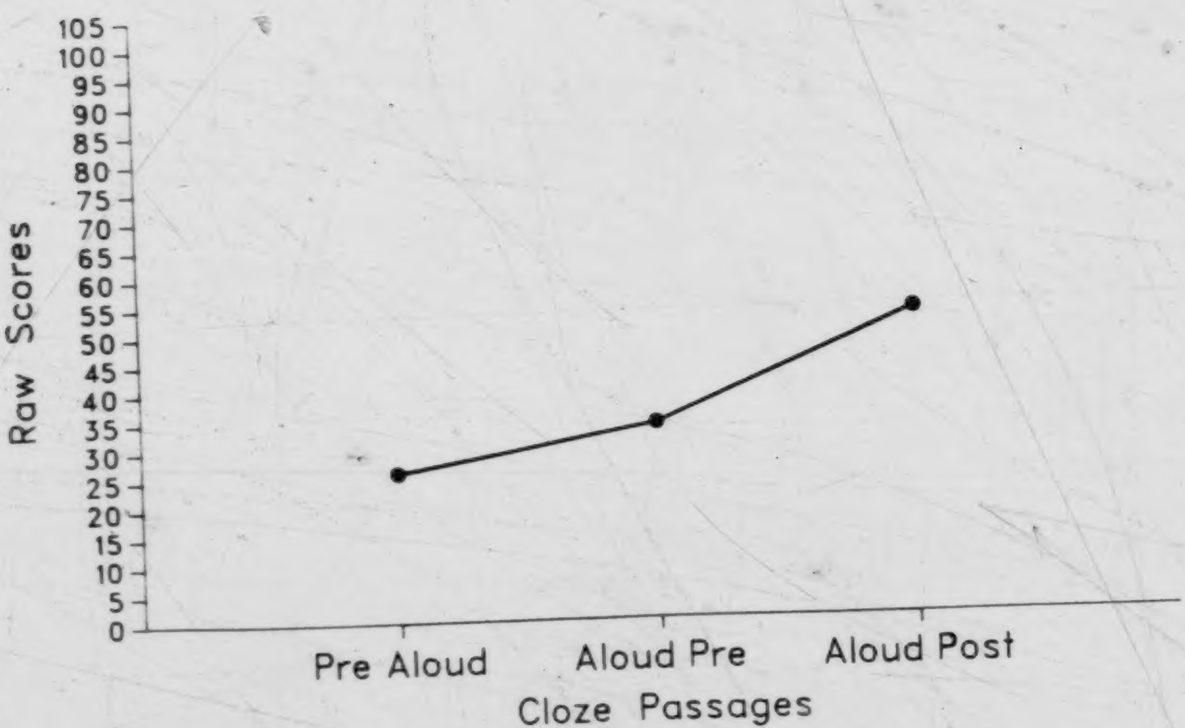


Fig.10. Performance of Student 13 on Cloze Passages



Reading Test. On the comprehension subtest, his grade equivalent also dropped 5 months from 5.1 to 4.6 (see Table VI). This drop may have been due to his lack of interest in and desire to leave school and was considered clinically significant.

Locus of Control Scales

While no post test measure was available on the IAR, the pre test results indicated a person who accepted a high degree of responsibility for his successes (see Table VII). This was confirmed during all assessments by the actions of Student Fifteen. He was insistent on knowing the expectations, reasons and rationale for particular tests. As well, the Rotter confirmed that Student Fifteen was highly accepting of personal responsibility for outcomes (see Table VII).

Teacher Ratings

It is interesting that despite his repeated requests for clarification as to how to proceed in the study, along with his repeated requests for assistance in interpreting directions and questions in assessment items, this student was seen by his language arts teacher as lacking any form of organizational strategy. In addition, a failure to focus, a failure to monitor himself, a failure to clarify directions and a failure to establish a plan of action were some of the deficits in strategy planning identified by the language arts teacher.

It may be that the attempts at clarification with the instructor were gamesmanship to establish his role as the dominant male, a characteristic which surfaced in his work with the instructor and was later confirmed by his teachers. Another possibility which has some support from the behavioral observations of the instructor was that despite asking all these questions, he did not integrate the answers into his responses.

While the math teacher was somewhat more positive in his view of Student Fifteen, support for the perceptions of the language arts teacher was provided.

Introspection Passages

Only one of these passages was completed with the balance being dropped due to non-attendance. The predominant strategy in this passage was the use of interpretation strategies. As well, references to personal examples abounded. Unfortunately, use of these strategies tended to detract from completing and understanding the passage. This finding of excessive reference to personal experiences detracting from an understanding of the passage may correspond to the lack of focus in daily tasks reported by his teachers.

Scrambled Sentences

None of these were attempted due to non-attendance.

Cloze Passages

With the recognition that Student Fifteen was not going to be present for all tasks, an attempt to have complete data on one task was made. It was successful with the cloze passages. As his scores indicate in Figure XI, Student Fifteen scored well on the pre aloud condition. He improved his accuracy on the aloud pretest but his performance on the aloud post dropped.

It may have been that motivation played a role in this result. However, based on behavioral observations and reports from his teachers, this response was somewhat typical and depended on his ability to focus. Despite this comment, the teachers and counsellors did not perceive this situation to be an emotional one, rather they associated it with his typical behavior heightened by the approaching summer holidays.

Despite his relatively high level of performance, Student Fifteen did little introspection and responded only briefly to retrospective questions. Therefore some estimation is necessary on the part of the author and raters. His main strategy appeared to rely on getting the main idea of the passage by interpretation with some rereading, then filling in the blanks. As well, he used personal experience repeatedly. It was amazing to note the increased focus and strategic planning in the cloze as opposed to in the introspection session. This may be related to the fact that his math teacher, who would have more class structure than in language arts, reported him to be more organized than did his language arts teacher.

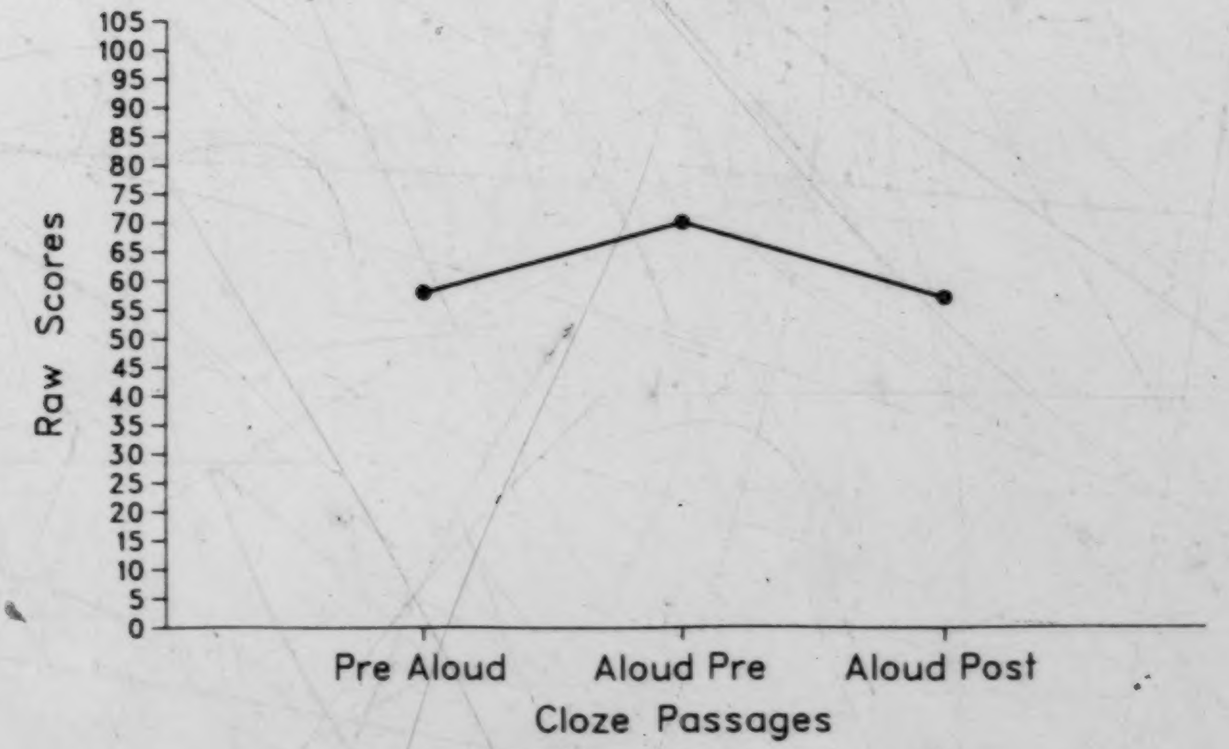
Little change in strategy use was observed between pre and post assessment conditions (see Tables VIII and XI).

Overview of Control Group

The control group tended to accept self responsibility for success in both pre and post conditions. However, they tended to shift towards accepting less responsibility for failures in the post condition.

Generally, the control group was perceived by their math and language arts teachers on the teacher rating scale as impulsive, failing to use systematic planning, failing to communicate clearly, lacking a focussed attention, using

Fig.11. Performance of Student 15 on Cloze Passages



trial and error responses and failing to clarify directions.

In the cloze passages, performance tended to improve across pre aloud to aloud pre to aloud post. However, in scrambled sentences a drop in performance was recorded with the introduction of think aloud.

Only one of the students in the control group utilized a monitoring strategy. Four of the students required a concrete approach to problem solvingwhile it could not be certian whether the fifth student was a contrete or abstract thinker.

A variety of strategies emerged under pre and post conditions. Included were attempts at interpretation, reading ahead, rereading, re-statement, attempts at hypothesis generation and scanning. As well, some students attempted to utilize visual imagery, personal experiences, reference to the main idea, reference to the mood of the story and questioning of self and others as strategies. Little change in the types of strategies generated from the pre to post measures was recorded.

In the peer teaching situation these students tended to be passive. It is important to note that while three students felt positive about the process, one did not enjoy the strategy assessment. Another student did not complete all the tasks, apparently as a result of wishing to leave school.

Learner Strategies Group

Student Two

This 18.2 year old female with a full scale IQ of 70 on the Wechsler Intelligence Scale for Children-Revised worked with Instructor Four (the unemployed teacher) and was randomly assigned to the LSET group. With the exception of the idea units, she completed all assigned tasks in a positive cooperative manner. She became quite open in her discussion as time passed, and felt more positive about herself and her work in the study.

Stanford Diagnostic Reading Test-Brown Level

A slight gain of 1 month was recorded in her vocabulary scores from pre to post. However, in reading comprehension a gain of 7 months was recorded (see Table VI) This gain in comprehension may be considered clinically significant. Reasons for the positive shift for this student may be attributed to the intervention as a marked difference in attitude, confidence and strategy use was evident at the end of the study. However, it was not expected to be demonstrated on such a global measure as the Stanford Diagnostic Reading Test. Other factors including chance error may have played a role.

Locus of Control Scales

Student two tended to be accepting of self responsibility for outcomes according to both measures on both pre and post conditions (see Table V). A slight shift toward an increased acceptance of self responsibility for success was observed on the IAR comarisons resulting in a gain of 3 points from pre to post on the total score. The post test scores are considered to be in the low average range for her age peers. A similiar slight movement toward acceptance of personal responsibility for outcomes was observed on the Rotter (see Table VII). These scores on the Rotter are considered in the high average range for her age peers.

Teacher Ratings

A gain of 20 points between the pre and post rating by her math teacher was recorded. As well, a gain of 18 points between the pre and post rating by her language arts teacher was recorded (see Table VII). This meant that teacher perceptions of her approach to academic work shifted from perceiving her as disorganized, lacking focus, failing to pay attention and failing to proceed in a systematic manner to a more positive view of a person who attended to and clarified directions, organized and planned her work and attempted to provide greater clarity in her answers. It is important to note that some shift from the score of 50 in the pre test rating by the math teacher would have been expected simply as a statistical artifact of regression toward the mean. However, the total shift is considered clinically significant.

This change in strategic behavior was confirmed by the instructor, and by observations recorded on audio tape. As well, in the final interview, student two stated that she viewed her approach to problems differently.

The greater shift perceived by the math teacher over the shift perceived by the language arts teacher may have been explained by the student in the final interview. She asked the interviewer, "Did you know that these strategies can be used in math?" In the ensuing discussion, it was revealed that while math strategies had not been trained in the study, the student had spontaneously generalized the reading strategies to assist her in math. This finding was expected only with longer term training. It was concluded that the training had an impact on this person since she readily incorporated new strategies into her repertoir and generalized their use to other settings. Such an occurance typically is not expected of a person with a full scale IQ of 70. While this happened in only one case, it does hold promise for further exploration.

Introspection Passages

Use of the introspection passages generated a richness of strategies in both aloud pre and aloud post conditions. Two additional strategies were elicited in the aloud post condition. Specifically, the student use visual imagery and main idea in the post aloud assessment. The use of main idea as a strategy was a part of the intervention.

Strategies used in the aloud pre condition were used more frequently and with greater confidence in the aloud post condition. These included interpretation, drawing inferences and making hypothesis, use of perosnal experience, sensing the mood and recalling that an idea expressed earlier in the passage was repeated later in the passage. In the post aloud condition, there was greater use of these strategies along with attempts at verification of hypotheses, and interpretations. This was accomplished by scanning over the passage, rereading, or reading ahead when she stopped at a dot (see Tables VIII, XI, XII and XIII).

This trend towards an enhanced use of type and frequency of strategies also was found in the cloze procedure.

Scrambled Sentences

While the scrambled sentences task did not elicit as rich a variety of strategies as did the cloze and introspection procedures, examples of "meta" cognitive monitoring were revealed. For example, Student Two on four occassions made comments such as "This one is more difficult than..." or "This one is real easy! I won't have trouble with this."

In aloud pre and aloud post coditions, Student Two would read each card, then she would attempt to organize the cards and reread the total set. Strategies that did emerge included use of a logical sequence and reference to key words that cued the correct order.

While a review of Figure XII reveals that Student Two scored 100% on the pre aloud, aloud pre and aloud post conditions, her timing improved across all three coditions moving from about three minutes on the pre aloud condition for seven units to about two minutes on the aloud post condition for seven units.

Cloze Passages

During the aloud pre assessment condition, strategies elicited included attempts at interpretation, generating hypotheses, use of personal experience or background knowledge and sensing the mood. As well, comments indicating "meta" cognitive monitoring of the perceived difficulty level of the passages were made. For example, when reading the story on the penguins she commented, "OK! This is a more difficult one."

In the aloud post codition these same strategies were elicited. However, Student Two was more confident and made more attempts to verify hypotheses and interpretations. This was facilitated through her use of the additional strategy of main idea or thinking through what the passage was about. As well, she questioned herself, questioned the instructor, reread sections, read ahead, and used scanning forward and backward for confimatory information, or to find a similar word.

Use of these additional strategies and the think aloud procedure are believed to have contributed to her improvement in accuracy from pre aloud to aloud pre and to aloud post as represented in Figure XIII.

Intervention

No outstanding incidents were recorded during the instructional process. Student Two was cooperative, interested, readily accepted assistance, was quick to respond, participated in the process and accepted a leadership role—all part of the LSET procedure. Her verbal abilities appeared well suited to the process and her confidence grew as she progressed. The instructor reported that the experience was positive for both he and the student. Student Two achieved 100% on the first criterion passage.

Student Four

This 17.3 year old male with a full scale IQ of 70 on the Wechsler Intelligence Scale for Children—Revised worked with instructor 3 (the retired female teacher). Student four

Fig.12. Performance of Student 2 on Scrambled Sentences

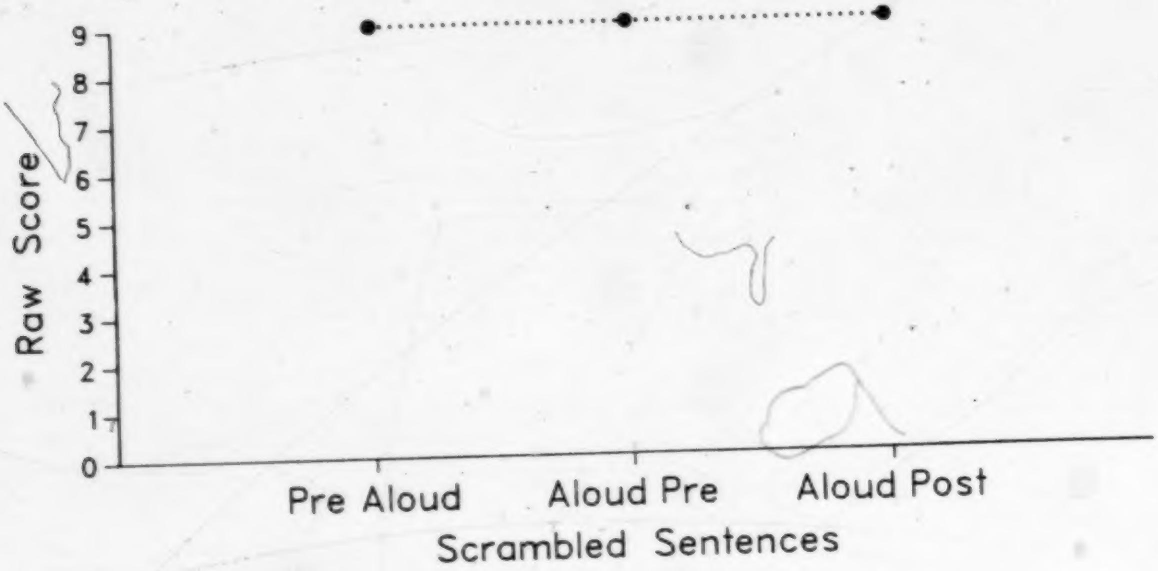
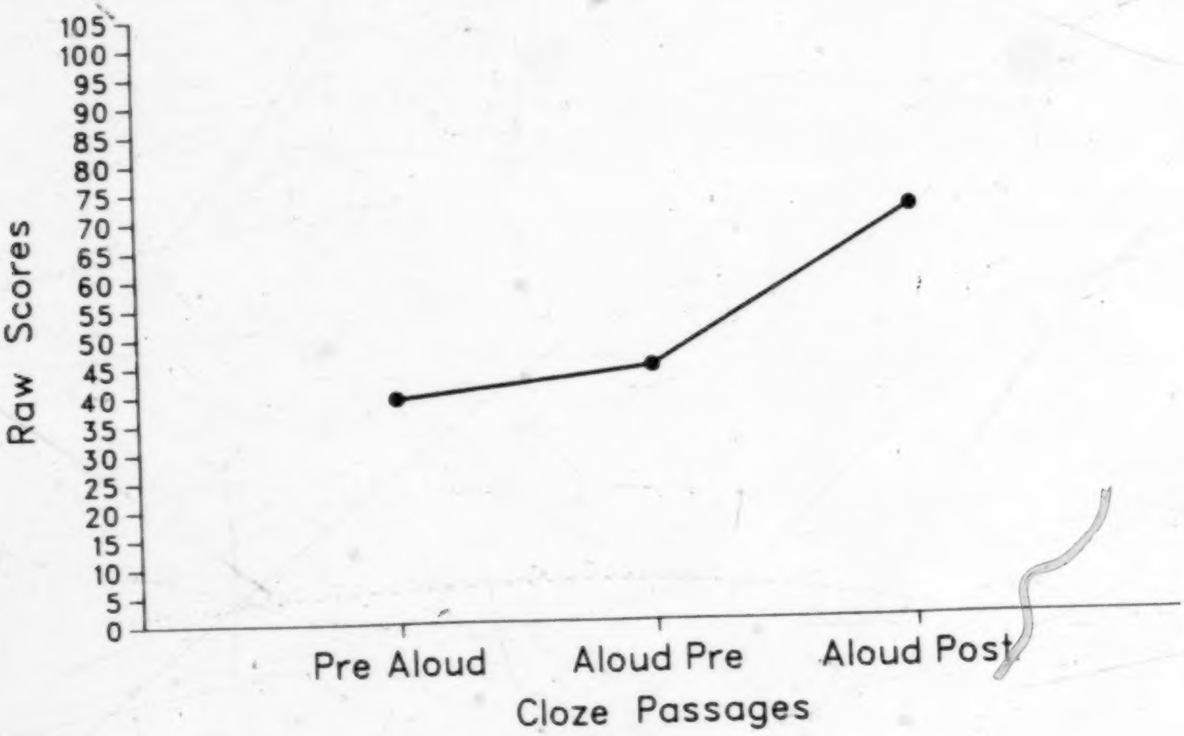


Fig.13. Performance of Student 2 on Cloze Passages



was randomly assigned to the LSET group. He was in his fifth year at L.Y. Cairns School. He completed all parts of the study with the exception of the main idea units, the video tape and the final interview. He did not want to participate in the peer teaching and was unavailable for the interview.

Stanford Diagnosatic Reading Test—Brown Level

While a slight increase in pre-post vocabulary scores was recorded, no clinical signifance was attached to the gain (see Table VI). A surprising finding was that a drop of 4 months was recorded in the pre-post comprehension scores (see Table VI). While the drop may represent regression, a chance finding or an artifact of the test format, it also may have resulted from the think aloud procedure or the intervention utilized in the study. The drop is considered clinically significant.

Inconsistent findings were confirmed in other measures and from behavioral observations of this student. In general, no strong shifts occured in any direction. However, small gains and losses were revealed across all situations.

Locus of Control Scales

Once again inconsistent results were observed with Student Four. On the Rotter, Student Four tended to view outcomes as being controlled more by external than personal factors. This finding was strengthened from pre to post assessment (see Table VII).

However, on the IAR Student Four was within the average range for his age peers accepting some responsibility for academic successes and failures. As well, a slight shift towards greater acceptance of personal responsibility for academic outcomes was observed from pre to post (see Table VII).

Instructor observations supported by teacher feedback tended to support the findings of the IAR. Since the two tests measure locus of control from a different perspective, it may be that events in general such as reflected on the Rotter are viewed as more beyond his control while academic events are viewed as more within his control.

Teacher Ratings

Generally, Student Four was perceived as lacking organizational skills; the ability to focus, attend to directions and establish a plan of action. Teachers reported having difficulty rating Student Four because of his inconsistent interest and work habits. While no radical behavior problems were reported, it appears as one teacher commented that Student Four was a "middle of the road type with good days and bad; but none of them are that good, or that bad!" The instructor disputed this statement. She felt that some days were much worse for Student Four, in particular she noted more difficult days during the intervention and during assessments involving the introspection passages and the cloze passage on folktales. A check with school personnel revealed that this behavior was unusual. It may have resulted from the one to one situation, the teaching and management style of the instructor, the tasks required of Student Four, or some combination of these and other unknown variables.

Despite the identification of these problems, it is important to remember that rapport was maintained. As well, the student expressed positive feelings about the instructor and the study when questioned by one of the school counsellors in an attempt to determine whether any reason for the more dramatic behaviors could be determined. Also, in a discussion with the instructor, the student stated that he thought that the approach of trying out new methods was good and hoped that the teaching profession would improve as a result of this study.

A shift indicating a slight improvement in use of strategic classroom behaviors as indicated on the rating scale by the math teacher from pre to post was recorded. The same two point shift was recorded by the language arts teacher from pre to post (see Table VII).

Introspection Passages

In the aloud pre assessment Student Four generated some hypotheses about the material he was reading. However, he did not check on the accuracy of his hypotheses. An example that may have best exemplified one of his more common approaches to comprehending a story was contained in a statement he made several times during the aloud pre condition, "I don't know this, no, I'll skip it." Another favorite statement following a dot in the aloud pre condition was "that sounds right." Retrospective questioning brought a repeat of "I don't know, seems to be right".

During the post assessment he maintained use of the hypothesis generation strategy and did on one occassion try to verify its appropriateness. Other strategies elicited in the post condition included use of personal experience and use of visual imagery. His use of personal experiences interfered with his understanding of the passage as evidenced in subsequent discussions on the passage. For example, he told of reading a story about the whale who killed people. Later interpretations reflected the danger of whales to man. In addition he formed some interpretations but did not verify the appropriateness of those interpretations.

During the post session, Student Four became very upset with the story on superstition but felt very positive about the story on whales. It appears that the reference to "luck determining events in life" angered him. This may be related to information gained on the Rotter which indicated that he viewed outcomes as being more under influences beyond his control, such as luck.

It is important to note that he did not use the statement "that sounds right" after a single dot in the post condition. Rather, he searched for other interpretive or restatement type responses.

Scrambled Sentences

During the pre aloud condition Student Four appeared tired and supported his head by his hand. This continued in the aloud pre condition. However, in the aloud post condition he was more energetic and read items faster. In all three conditions he would read, re-order cards and reread the cards. It is interesting that, as depicted in Figure XIV, there was a small improvement in successful completion from pre aloud to aloud pre to aloud post.

Strategies that emerged in the pre condition included asking the instructor clarification and statements to the effect that "it sounds right".

A greater variety of strategies emerged during post testing. These included the use of personal experience which tended to interfere with completion of the task. Reference to the main idea of the story was also present. This had been part of the training package. As well, there was one use of semantic cue. Use of "it sounds right" decreased, but it was still present.

Cloze Passages

It was interesting that Student four approached these passages with confidence. However, at the brginning of the aloud pre assessment procedure, the confidence and positive feeling had turned to anger. This may have been a factor in the drop in the number of blanks correctly completed in the aloud pre condition from, those correctly completed in the pre aloud condition (see Figure XV). As well, the instructor dropped some of the retrospective questioning in order to maintain rapport. This resulted in little clarification as to how Student Four was reasoning.

At the end of the assessment in the pre condition, student four stated that he felt he was wasting his time. The instructor reviewed the intent of the study. She stated that they would work together on some reading activities a little later. This appeared to satisfy Student Four and he agreed to continue.

During the pre testing the most common statement by Student Four was "it sounds right" and "it popped into my head". Few spontaneous think aloud comments were made. However, it did appear as though the student was using the concept of main idea to assist him fill in some of the blanks.

The use of the response "it popped into my head" was dropped in the aloud post condition. Another strategy that emerged included rereading. He maintained and expanded on the use of the strategies of main idea and visual imagery. Both of these were part of the intervention program.

Student Four did monitor himself and his reading in the aloud post condition. For example, he commented on the difficulty of one passage in relation to a second passage. On another occasion he had made a mistake in paragraph one,

Fig.14. Performance of Student 4 on Scrambled Sentences

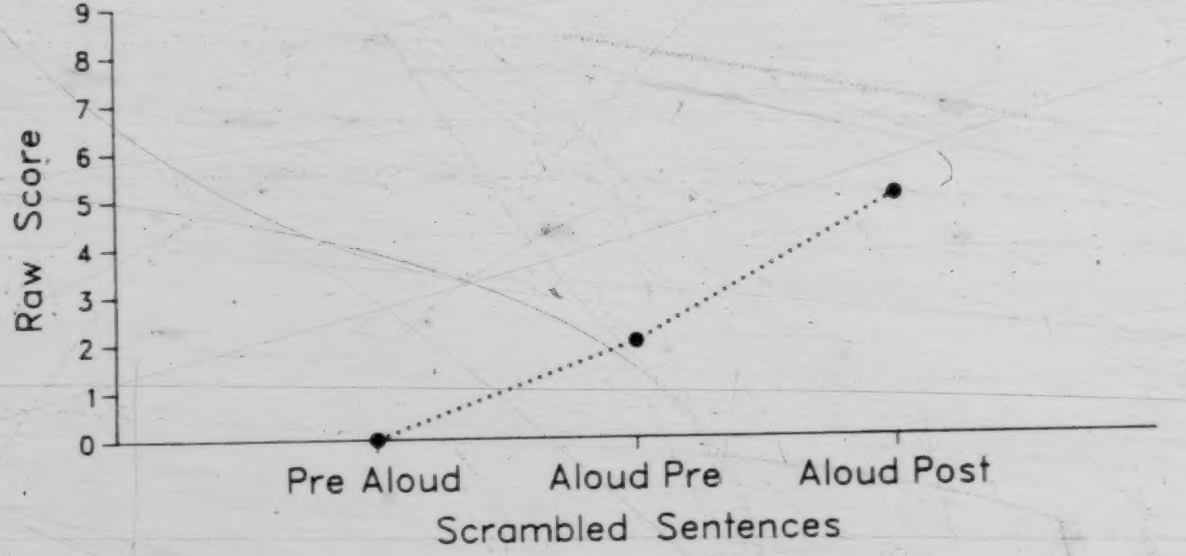
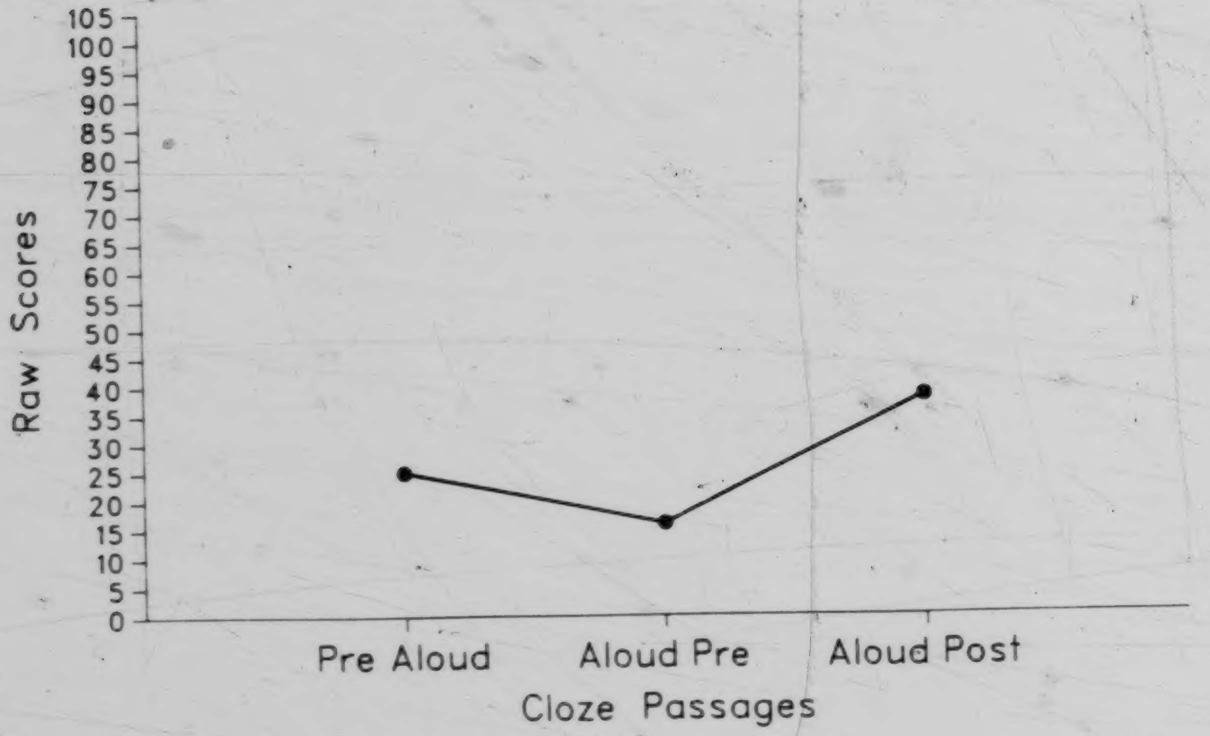


Fig.15. Performance of Student 4 on Cloze Passages



but saw the correct word in paragraph three. Then he returned to correct the word. This was scored as an example of recall.

While his accuracy level dropped with the introduction of the think aloud procedure, his aloud post performance improved (see Table VII and Figure XV).

It appears that both in terms of strategy use and accuracy, the intervention did have some limited but positive import.

Intervention

Student four was restless during training. There were expressions of both frustration and anger with the process. At one point the student took the microphone of the recorder and stated, "Listen you people at the university, I want you to know how hard this is."

The instructor discussed this statement with the student. While both decided to continue, it was apparent from the remarks made by the student in the discussion that the assessment process was too long, that the constant requirement to plan ahead and think about what was being read in the intervention was viewed as confrontational and overly demanding, that the procedure produced too much stress to focus attention and perform with accuracy. For this student, and perhaps for other students of a similar disposition, the LSET procedure may be viewed as too demanding and some intermediary steps may be necessary to ease the transition.

This finding is an important one and exemplifies the rapport and openess that existed between the student and the instructor. Also, it exemplifies how as researchers we sometimes persevere beyond desirable limits despite recognition of a potential problem in order to test the limits of a procedure. While this was not an intentional abuse of the students feelings, it offers a cautionary note for group research where this event may not have become evident. Steps were implemented to ensure that the student was more comfortable with the balance of the process. One example was the dropping of prompts, the reduction of retrospective questioning and provision of an increased number of times off task.

Student four achieved 80% on the first criterion passage. Despite reaching criterion, the instructor felt that this was a chance happening. However, no further intervention was attempted in order to preserve rapport.

Student Five

This 16.7 year old male with a full scale IQ of 70 on the Wechsler Intelligence Scale for Children - Revised worked with instructor 1 (the author). Student five was randomly assigned to the LSET group. He was in his fifth year at L.Y. Cairns School. With the exception of the main idea units, he completed all parts of the study in a positive, co-operative manner. Good rapport was established and maintained throughout the study. Student five had a high level of perseverance.

Stanford Diagnostic Reading Test - Brown Level

No clinically significant differences between pre and post vocabulary and pre and post comprehension scores were obtained (see Table VI). The small gains were within those expected in a retesting situation.

Locus of Control Scales

Once again, only small changes between pre and post measures of locus of control were observed. According to results obtained on the IAR, Student Five accepted responsibility for his successes to a greater extent than he accepted responsibility for his failures (see Table VII). In total a 3-point gain was observed from the pre to post assessment condition (see Table VII). ~~His~~ post measures were about average for his age peers. This small trend to being more accepting of self responsibility for outcomes was confirmed by the results on the Rotter. While he perceived general events as subject to factors beyond his control, a small 2-point shift toward perceptions of self responsibility for outcomes was observed. Based on the Rotter he was much more externally dominated than his age peers.

The difference between the Rotter and the IAR may be due to the fact that the IAR measures perceptions of academic achievement while the Rotter measures more global perceptions. This hypothesis was supported by discussions with Student Five during his final interview.

Teacher Ratings

Generally, Student Five was perceived by both his math and his language arts teacher in the pre test condition as lacking organizational ability, preciseness in communication and the ability to focus, attend and establish a systematic plan of action (see Table VII). These comments were confirmed by the instructor.

An improvement of 13 points was indicated by the language arts teacher in the post intervention rating. This clinically significant improvement was not observed by the math teacher who indicated a similar rating on the pre test rating (see Table VII). However,the instructor did not perceive such a radical shift in student use of strategic behaviour. The instructor would have given a rating somewhere between the rating given by the two teachers. This interpretation was confirmed by two colleagues involved in the research, the interviewer and a rater who listened to the audio-tapes and viewed video-tapes.

Introspection Passages

Student five was a very slow methodical worker. He took time to recount each and every detail of the preceding sections in a passage. As well, he would spend long periods restating and interpreting the sentence that preceded a dot. Every word was subject to a comment.

Strategies that emerged during the aloud pre condition included limited use of reading ahead; use of inferences and hypothesis generation, but not hypothesis testing or verification; and interpreting a sentence as a single entity without relating it to the main idea.

While aloud post testing revealed an enhanced use of strategies both in quality and quantity, strategy use was tied to concrete examples and application. Among the aloud post condition strategies was some use of visual imagery. However, this strategy was found in the aloud pre cloze passage and should not be viewed as resulting from the intervention. Limited use of the main idea of the passage was evident along with verifying any predictions/hypotheses or inferences he had drawn. An example of hypothesis verification took place in the passage on superstition. Student five read the items regarding sports figures spitting for good luck. He stated, "Hm, I bet they tell about actors wishing each other to break a leg for luck. Hey! Yeah, there it is. See I told you that would be here." Use of the main idea was discussed in training.

A final strategy that emerged in the introspection passages was that of posing questions to himself and to the instructor. Despite training to ask questions before and during the reading of a passage, Student Five had used this strategy in the cloze aloud pre condition. While use of the questioning strategy cannot be associated with training, its effectiveness and application appeared to improve (see Table VIII, XI, XII and XIII).

Scrambled Sentences

In the pre aloud condition, Student Five scored 7 correct out of a possible 9 (see Figure XVI). His strategies seemed to work well for him and included rereading, some interpretation and some inferencing or hypothesis generation.

During retrospective questioning following completion of the aloud pre assessment, Student Five reported that he would choose the first and last items and then fill in the middle. However, in response to many of the questions Student Five would comment "it pops into my head", or "it sounds right".

A greater quantity and quality of strategies emerged during the aloud post assessment. The use of statements such as "it pops into my head" and "it sounds right" were dropped. In its place was an attempt to judge logical sequence using semantic cues. As well, the strategies of rereading and hypothesis testing were strengthened and used more frequently.

Fig.16. Performance of Student 5 on Scrambled Sentences

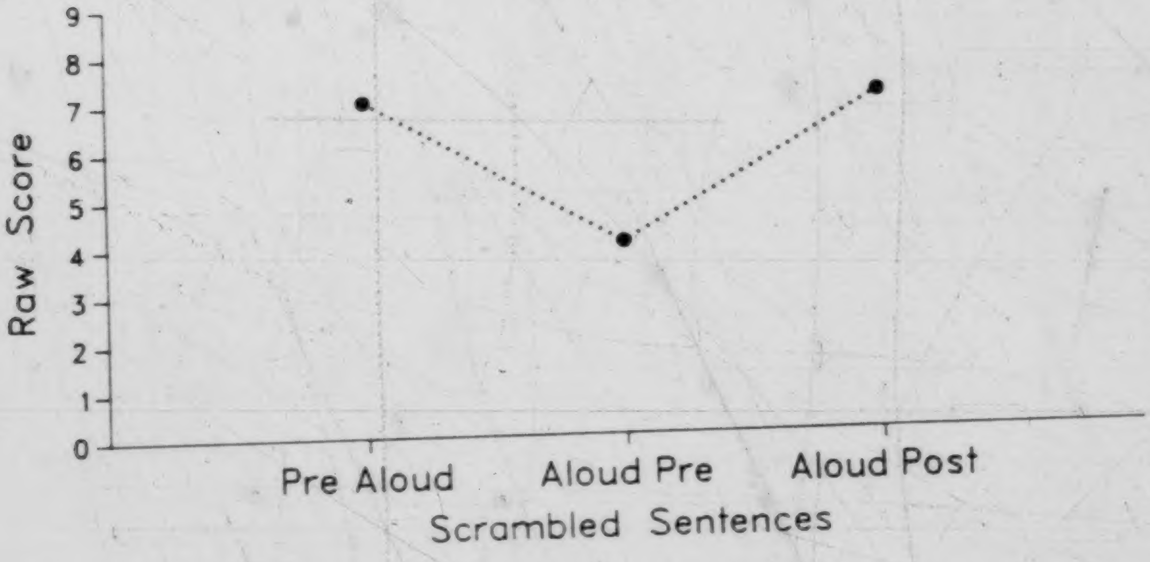
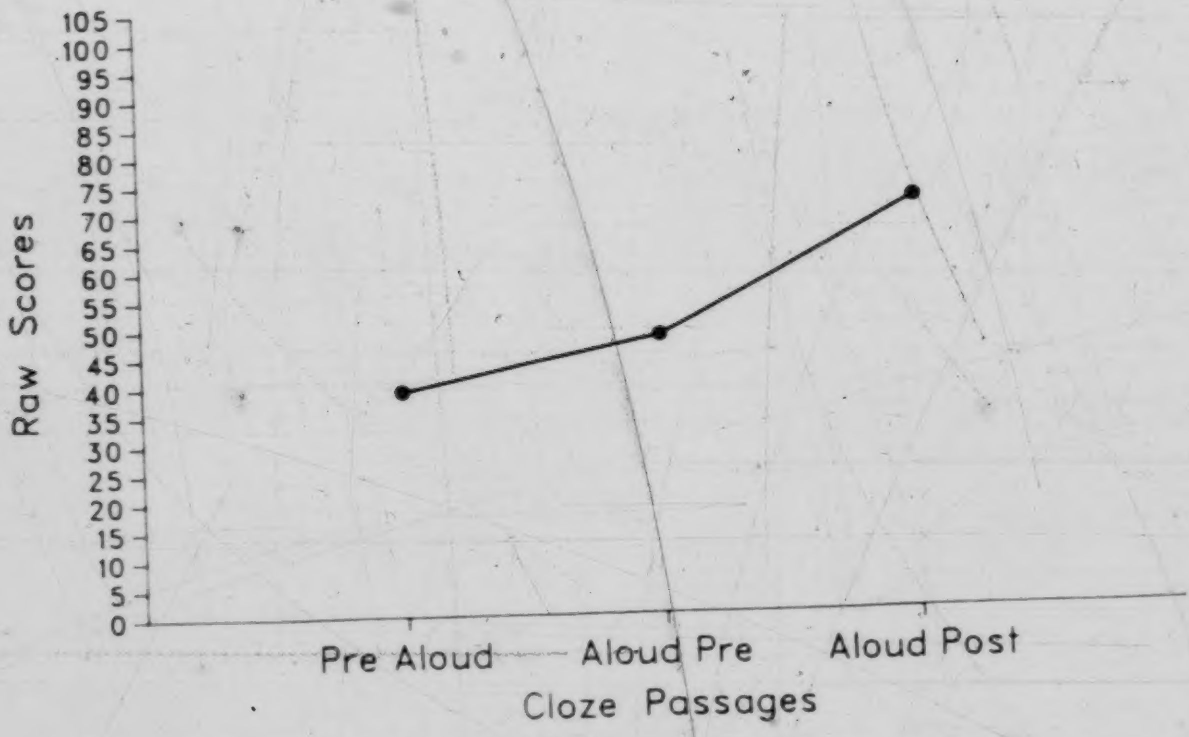


Fig.17. Performance of Student 5 on Cloze Passages



While his score dropped to 4 out of 9 with the introduction of think aloud, it went back to 7 out of 9 in the aloud post condition (see Table VI). Because of his slow reading style, the think aloud procedure may have caused a loss of conceptual flow since the student was required to both read, think and express himself. While it was hoped that the collaborative interview format may assist in open communication, the point that some students have to stop and think before organizing a sentence may have interfered with the spontaneous introspective response, particularly with a student who proceeds slowly and methodically.

Cloze Passages

As with other students, the cloze passage provided the greatest information relative to strategy use.

The performance of Student Five consistently improved from pre aloud to aloud pre culminating with a clinically significant improvement in aloud post. This is visually depicted in Figure XVII.

A number of strategies were used during the aloud pre condition. These included a rereading strategy and a scanning forward strategy. However, Student Five did not move further than one line away from his present line when he was rereading, limiting the effectiveness of the strategy. Questions to the instructor and self questioning techniques also were used as was limited use of visual imagery and personal experience. A specific example of the use of personal experience and visual imagery took place in the passage on whitetale deer during which the student described his view of a deer. The student referenced seeing a deer in Jasper and said he could see it running with its tail curled up.

On one occasion Student Five made use of the main idea of the story to fill in a blank. However, retrospective questioning revealed that he did not recognize the significance of his action, nor did he know what a main idea entailed. On another occasion he used a semantic cue but did not realize what he had done. In other words, while some strategies were within his repertoire, he was not using them consistently nor could he apply them if asked. This was interpreted to indicate a lack of meta awareness of strategies and strategy use.

While his favourite response to requests for reasons as to why he selected a certain word was that "it sounds right" or "it just popped into my head", frequently he made hypotheses predicting what might happen. However, he did not test to determine the accuracy of these attempts, nor did he recognize a failure. In other words, there was little evidence of "meta" cognitive monitoring.

One particularly interesting finding was that while discussing the passage upon completion of his work, Student Five gave text specific (Drum, 1975 and Fagen, 1981) type recalls, that is, he provided minimally altered information from the passage that he recalled. As well, the information was in the same order. While analysis of recall was not a feature of this study, it was interesting to note almost perfect recall. However, when asked a comprehension question about the passage that had been recalled so well, the student was unable to provide an answer.

Despite the presence of these strategies in the pre conditions, most answers were based on random guesses. That is, Student Five was not really aware of existing strategies nor did he apply them consistently when he was aware of their presence.

Aloud post testing revealed that use of statements such as "it pops into my head" or "it sounds right" were dropped. The main idea strategy which was taught during the intervention was used with more frequency. However, this strategy was not well mastered.

The reading ahead and rereading strategies evident in the aloud pre assessment were used with more accuracy and more frequency. Both of these strategies were taught in the intervention along with the use of self questioning and organizing one's work. These strategies emerged more consistently as well.

His attempts at hypothesis generation and testing as well as his attempts at interpretating what was being said improved in the post testing. However, his ability to integrate information was severely impaired and limited to use in short paragraphs. He could not deal with a whole story. This interfered with the effective use of the hypothesis generation and verification strategy. While this was addressed during training, it was not the central focus of the training. Recall in the post situation was found to be the same as in the pre situation, text specific. However, this was not a spontaneous strategy. Perhaps his lack of ability to answer comprehension questions was related to his inability to integrate chunks of information.

Intervention

The period of training proceeded in much the same manner as did the assessments. Student five was very slow in his responses. He required concrete examples and had difficulty holding, retrieving or integrating training information. Because of his ability to provide text specific recall, it was hypothesized that his difficulty dealing with information on new strategy techniques resulted from his difficulties with the integration of new concepts.

There was a belief on the part of the instructor that for this student, the procedure caused fatigue and was too confrontive. While the student did not admit this to the instructor, he did state that he found the techniques very difficult and of limited use during the final interview.

Mastery on the first criterion passage was achieved at the 90 percent level. While he utilized many of the strategies in the criterion passage, he did not apply them as readily during post testing. One example was the use of underlining or checking important information to assist in finding the main idea.

Student Six

This 17.6 year old female with a full scale IQ of 67 on the Wechsler Intelligence Scale for Children - Revised worked with Instructor Two, the housewife. Student six was randomly assigned to the LSET group. With the exception of the main idea units, she completed all assigned tasks in a friendly, co-operative manner.

Stanford Diagnostic Reading Test - Brown Level

While no real differences emerged between the pre and post grade equivalent scores on the vocabulary test, a gain of six months was observed between pre and post grade equivalent scores on the comprehension test (see Table VI). This gain may be due to a chance factor, an artifact of the test, or be an indication of her true performance. While any of the above may be true, it also is possible that the combination of the think aloud procedure and the intervention had a positive impact on her comprehension level.

Locus of Control Scales

Student six tended to perceive herself as being responsible for both her academic successes and failures in the pre test condition using the IAR scoring slightly above the average of her age peers (see Table VII). Despite the high pretest score, a move towards enhanced self acceptance of responsibility for outcomes was recorded in the post test condition, particularly as it applied to self responsibility for success (see Table VII).

However, this tendency for accepting self responsibility for academic matters did not extend to general outcomes. Scores on the Rotter indicated that for her age peers, she tended to view general world outcomes as more beyond her control in both pre and post conditions (see Table VII).

Teacher Ratings

A very significant improvement of her organizational approaches to academic problem solving was perceived by both her math and language arts teachers. Pre intervention scores indicated that she was perceived as lacking the ability to focus, attend to directions and establish a systematic plan of attack. As well, clarity in communication was reported to be a problem. Post intervention scores showed a 17-point improvement in the rating by the math teacher and a 26-point rating by the language arts teacher (see Table VII).

It was concluded that the individual attention, the think aloud procedure, the LSET intervention and the resulting building in self confidence combined to effect these changes. This conclusion was based on observations by her instructor, her teachers, the interviewer and the raters who reviewed her audio and video tapes. It appears that a clinically significant shift in her approach to problems resulted. A check with her family did not reveal any other plausible explanations for this change.

Introspection Passages

It was interesting to observe the use of a self questioning technique in one of the aloud pre stories dealing with beavers. Unfortunately, while she could pose the question regarding the nature of a surprise, she did not know how to find the answer. Few strategies emerged, and most of the strategies were not well used. Examples included attempts at hypothesis generation, but not hypothesis verification; use of personal experience or background information; and one attempt to interpret a passage by using an analogy. While this proved helpful to her, her difficulties dealing with abstract information interfered with the full success of this venture in terms of assisting her to understand the passage. In the cloze passages aloud pre condition, student six ignored periods and tended to rush through passages. However, on the introspection passages, the use of the dot appeared to have forced her to stop and think before moving on.

Post testing added scanning (forward and backward) as a new strategy to assist in grasping the main idea of the story. This strategy had been taught during the intervention. While she had used the notion of main idea in cloze passage of the aloud pre condition, in response to retrospective questioning it became apparent that she did not understand the concept of a main idea. In the aloud post introspection passages, she was using it effectively to help integrate more information. Use of the main idea to help understand a passage was an important part of training.

Other strategies to emerge during post testing included rereading and reading ahead. While not used in pre testing, both of these strategies emerged in a limited way in the cloze aloud pre condition. In the aloud post introspection assessment, they were used with more confidence.

On all post testing, the two raters who reviewed the audio tapes and her instructor commented that this seemed to be a different person from the pre testing. She was much more verbal, more confident, volunteered more information. This change also was observed by her teachers and parents. Her instructor stated that this began to be noticed during the LSET training.'Two examples of her increased verbal activity and use of strategies are typified by the following comments during an introspection story:

1. "Hm? I don't know what to think here. I'll read more to see if it helps."
2. "OK, that's one paragraph. Before I go into the next one, I'm going to read the first one again to make sure I know what's going on here."

This type of behavior was part of the LSET training procedure. Another example to confirm strategy use was found through retrospective questioning. She stated that she often glanced back to get an idea of what she was reading to help her understand what the story was about. This was interpreted to be a look back strategy since it was "looking back" to a specific reference point in a deliberate move to retrive information.

Scrambled Sentences

During the pre testing conditions few strategies were observed. Some attempts of interpretation and a rereading strategy existed. She made some comments which led the instructor to believe that she had a very low self concept of herself in comparison to her siblings and her school peers. Examples included "I'm not good at reading", "My brothers are better in school than I am" and "I'm the dummy". Since building a positive self concept was to be part of the LSET procedure, some limited understanding of the impact of this on Student Six could be gained.

In fact, her self concept improved dramatically during post testing -- far more than expected. One example was her comment about her siblings, "Boy I showed__________last night, now I can get the answer as well as he can!" New strategies observed in post testing included the use of a scanning technique and use of semantic cues. In addition, Student Six verbalized monitoring herself making statments such as, "No, that doesn't sound right, it don't fit,...I'll try another". Rereading, interpreting and drawing hypotheses were strategies that continued from pre testing.

Given the dramatic change in self concept and strategy use, it was surprising as depicted in Figure XVIII that no real improvements in the number of correct completions took place from pre aloud to aloud pre to aloud post.

Cloze Passages

During the pre testing the most common approach used by Student Six was to read quickly through the passage, ignoring periods and guessing missing words. Some rereading and interpretation strategies emerged. As well, in one case she stopped and tried to gain the main idea of the passage but failed. An interesting observation was that Student Six upon finishing a passage would count the number of items missed and write it down.

Following intervention and during post testing two new strategies emerged and were used consistently and effectively. These were scanning and use of semantic cues. As well, other strategies such as self questioning, present in the aloud pre introspection section, were used more effectively. Student six, also sought clarification from the instructor and used personal experiences to assist her in the passage. An example of her self questioning technique and scanning technique is provided in this comment: "Darn, I know I saw that, where is it, oh, where? Where? Where?

Fig.18. Performance of Student 6 on Scrambled Sentences

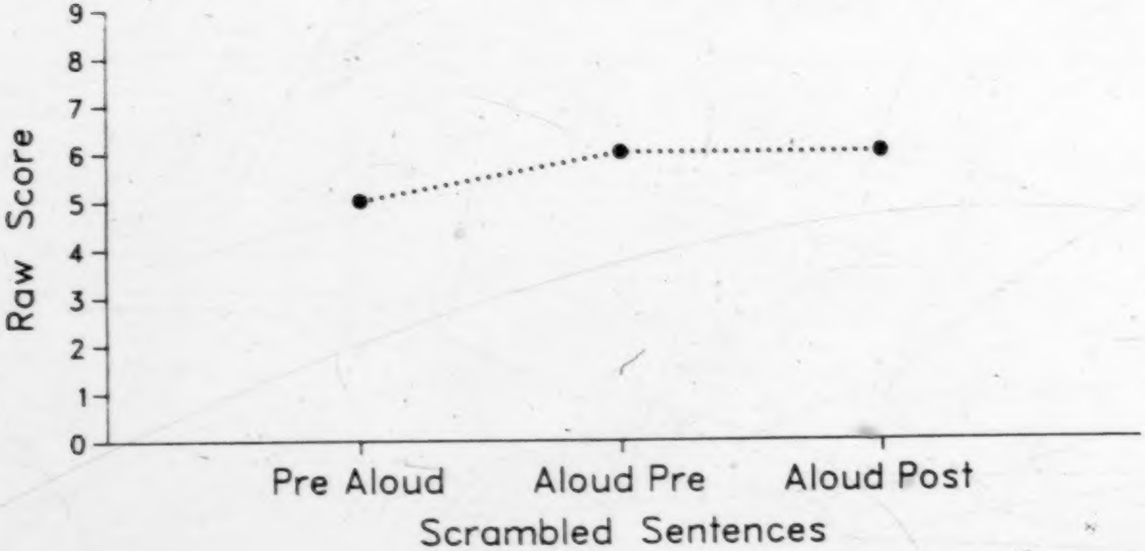
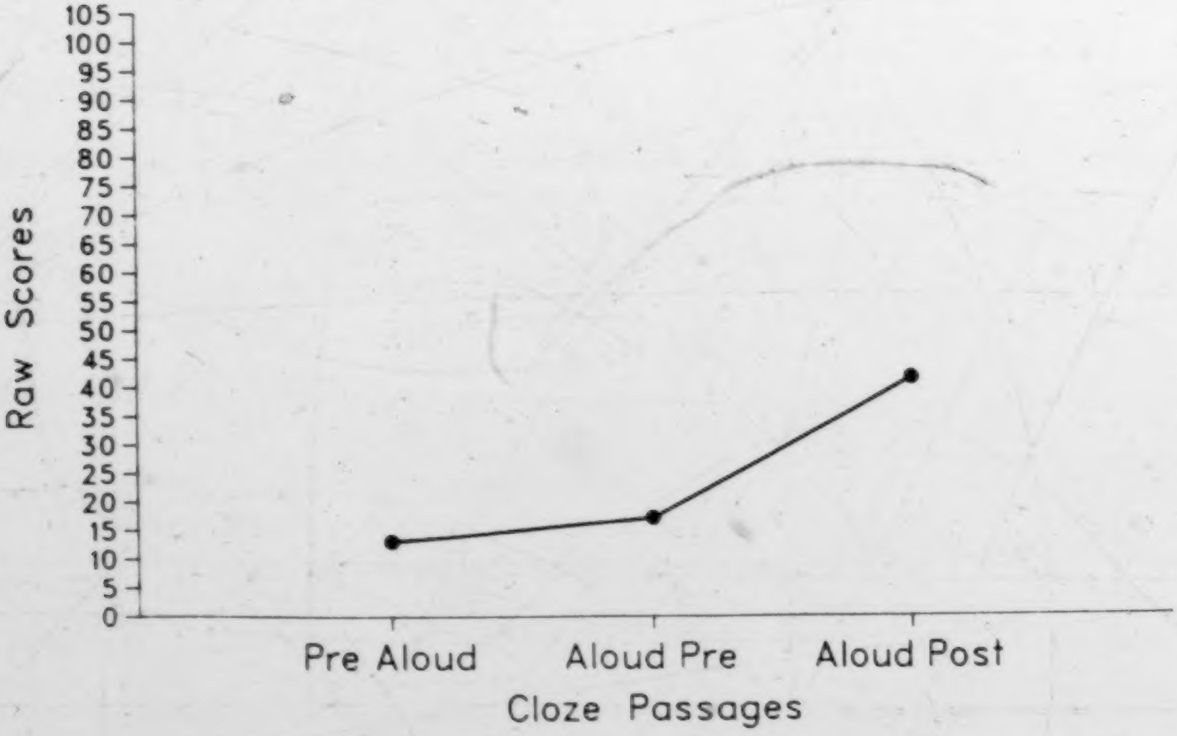


Fig.19. Performance of Student 6 on Cloze Passages



Here!" Rereading, reading ahead and use of logical sequence as strategies also were observed. As well, retrospective questioning revealed use of the statement "it sounds right". While this is not an effective strategy, it seemed to work for Student Six. Attempts to clarify what was meant by "it sounds right" were unsuccessful.

Evidence that the strategies were working can be seen graphically in Figure XIX. An increased accuracy in the completion of blanks from pre aloud to aloud pre to aloud post (41 of 103) was observed.

Intervention

An observable change took place in Student Six during the intervention. The instructor noted that the student became much more confident, more verbal, attended to directions, organized her work, and attempted to provide clarity in her answers. Interest, motivation and rapport was perceived to be at a high level. This finding was supported by the observations of her teachers.

While the student still had trouble with abstract ideas she responded well to the concept of finding the main idea and using it to understand the passages. She achieved 100 percent on the first criterion test. Her capturing of the flavour of LSET is epitomized in her own teaching of a younger confederate. She was eager, dynamic, sat close to the younger student, maintaned eye contact and used phrases such as "Let's hear that brain work...Next...Keep going, I want to hear how well you do this...Think back...What's the story about...Look up here and think about what Sally is doing..."

Student Nine

This 17.3 year old female with a full scale IQ of 70 on the Wechsler Intelligence Scale for Children - Revised worked with Instructor Five (the retired male teacher). In her fifth year at school, she was randomly assigned to the LSET group. With the exception of the idea units, peer teaching and final interview she completed all tasks. She was unavailable for the peer teaching and final interview due to leaving school early.

Stanford Diagnostic Reading Test - Brown Level

A small gain of three months was recorded on both the vocabulary and comprehension subtests (see Table VI). This gain may be due to the intervention, a chance factor or result from an artifact of the test. It was not considered significant.

Locus of Control Scales

Student nine accepted self responsibility for academic success and for academic failure, tending towards a high degree of self responsibility for her academic achievement. Little shift in the scores was recorded from pre to post testing. These scores were slightly above average for her age peers.

While a greater shift took place from pre to post on the Rotter, it apears that, when compared to her age mates, Student Nine tended to view general outcomes as being less within her control than academic outcomes (see Table VII).

Teacher Ratings

A dramatic shift in the view held of her by her language arts teacher was recorded. In the pre test condition, her language arts teacher saw her as disorganized, and failing to attend to directions, to focus her attention, and to develop a systematic plan. While a little more positive with regard to clarity in communication her math teacher held a similar view (see Table VII).

Her rating by the language arts teacher in the post test improved significantly indicating that she was perceived as being more attentive, more clear in her communications, better organized and utilizing a systematic plan of attack. While this perception was shared by her instructor, it was not shared by her math teacher who only slightly altered his rating of her (see Table VII).

It may be that she applied the strategies attained in the reading comprehension passages but did not generalize the strategies beyond reading and reading-related subject matter. Another interpretation suggested following a review of the audio-tapes by both the author and one of the raters was that Student Nine had learned a lot of surface strategies which portrayed greatly enhanced competence. However, these were strategies which did not truly assist her everyday comprehension. This would account for the little change in rating by the math teacher. However, it does not account for the gains made in cloze and scrambled sentence accuracy.

Introspection Passages

Only a few strategies emerged during the aloud pre condition. As well, these few strategies were not effectively utilized.

Her most frequent response when she reached a dot was to repeat what she had just read. Little integration of the ideas in the passage took place. While some hypotheses and inferences were generated, these were not tested nor confirmed. A limited amount of non-productive scanning did take place.

During the aloud post assessment condition, Student Nine exhibited a greater number as well as more effective use of strategies. She summarized what had been read and integrated new information with preceeding information. Indeed on at least three occasions she commented, "Boy I'm getting better."

While she was limited to a narrow range of abstractions, she appeared to use the concept of main idea to grasp the meaning of the story and to help understand the context of the passage. This was illustrated in the passage on superstition in which she expressed the main idea of the passage but did not generate ideas beyond the specific examples in the passage.

Student nine did not readily volunteer information during introspection with the result that a greater amount of retrospective questions had to be used. The danger in this is that the question may elicit a desired answer leading to a false conclusion. It was felt by the raters who reviewed the audiotapes that this may have contributed to an overly positive perception of improved performance by her instructor.

Nevertheless, new strategies included use of main idea, use of summarizing and use of scanning. Enhanced use of a rereading strategy and an interpretation strategy used in the aloud pre condition of scrambled sentences also was observed.

Scrambled Sentences Little difference between pre aloud and aloud pre and aloud post were observed (see Figure XX).

Despite the lack of quantitative difference, a qualitative difference emerged in the use of strategies. For example, the verbalizations by Student Nine indicated that she began to monitor her actions more closely. In addition, she became more verbal and more forward. Following completion of selected scrambled sentences using reading, rereading, scanning and interpretative strategies, Student Nine stated, "I know this is right." She displayed a great deal of pleasure with the task that was lacking in the aloud pre condition.

Often strategies would be combined. This was an unusual finding since many of the students used one strategy and then another, rather than using two or more at one time. Among the strategies combined were questioning the instructor, questioning herself and using the main idea. One example of this is found in the following comments by Student Nine:

> Let's see, it's about that kind of animal, ah, ah, what is it? (instructor does not reply)...I know but...I...the marmot! yea!"

While the questioning strategy was used in the aloud pre condition, it was not well used. Unfortunately, her proper use of the srategy did not help improve her text performance.

Other strategies used in both pre and post condition included rereading, making interpretations and generating hypotheses.

Cloze Passages

During the aloud pre condition the student was more dependant on the instructor for guidance than in the aloud

Fig.20. Performance of Student 9 on Scrambled Sentences

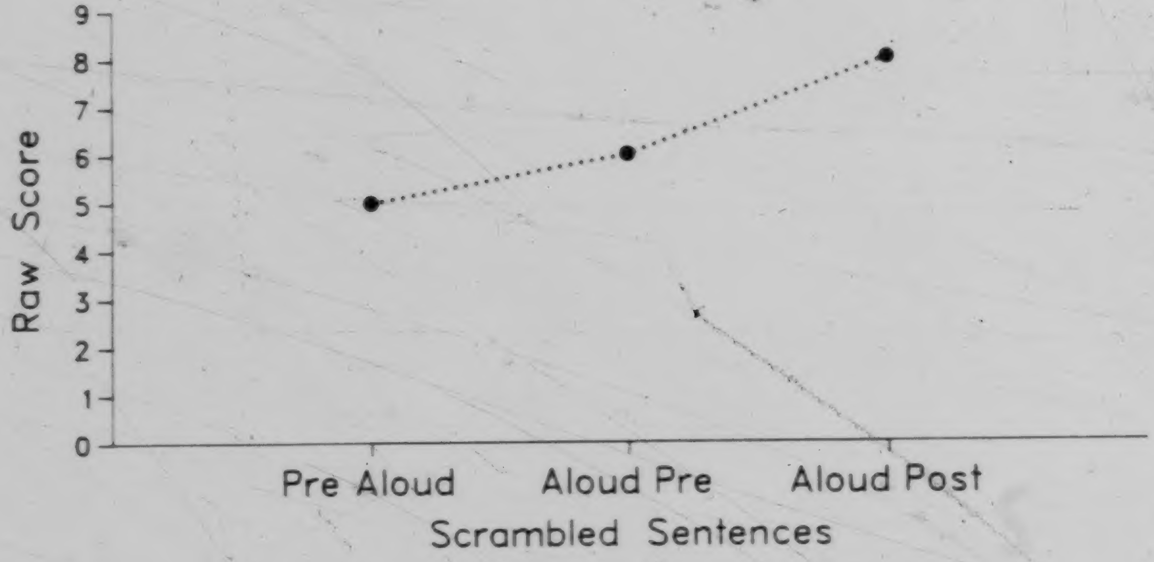
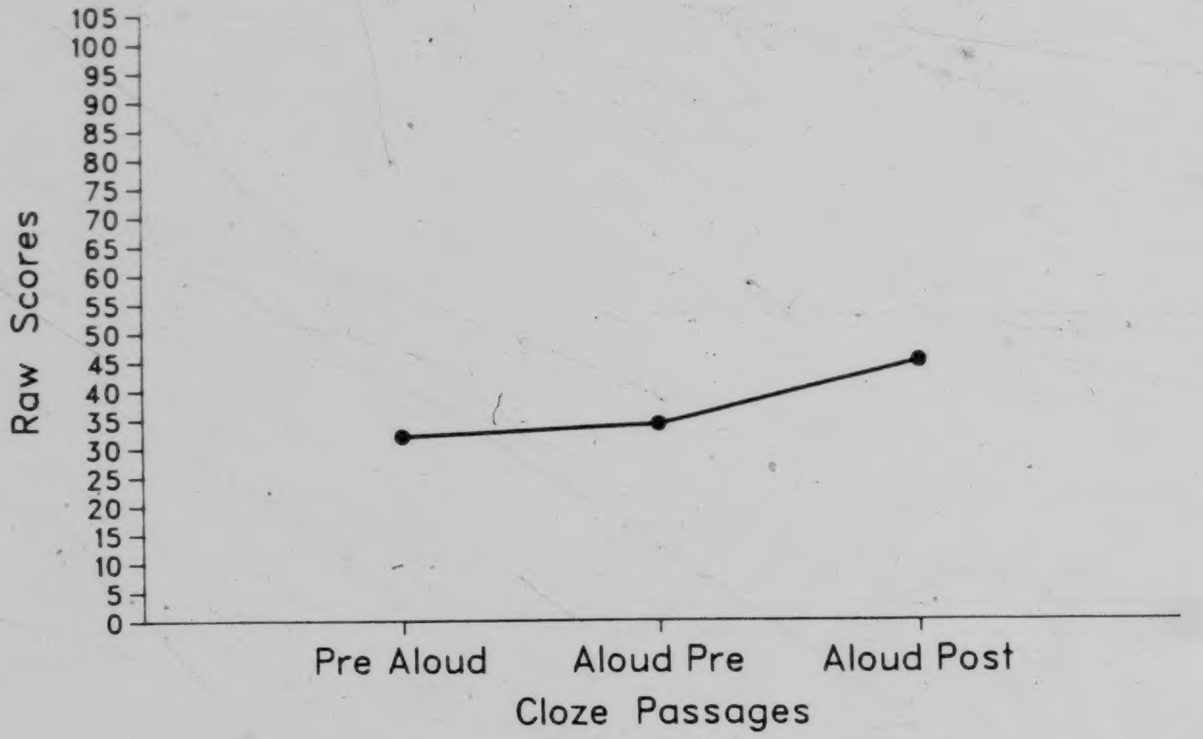


Fig.21. Performance of Student 9 on Cloze Passages



post condition. Student nine was not good at verbalizing, nor was she good using the introspective approach. Prompts by the instructor as well as use of retrospective questioning were necessary to elicit the type of strategy utilized. This was true in both pre and post test conditions.

It is possible that Student Nine learned some cues from the instructor's questions relative to understanding the passage. As well, it is possible that Student Nine had not internalized the strategies, resulting in a short term gain. This lack of internalization became evident to the raters who listened to the tapes. However, her instructor believed real progress as indicated by her scores had been made. While both interpretations are plausible, the conclusion reached was that new and more effetive use of existing strategies was evident in the aloud post condition. However, use of these strategies was not well developed.

Despite the pessimistic conclusion, it is important to remember that the use of main idea improved from pre to post testing. As well, Student Nine understood the nature of a main idea in the post test condition whereas she had not the pre test condition.

References to "it popped into my head" and "it sounds right" were replaced by more systematic and effective strategies such as scanning the whole passage for clues during the post test situation. As well, hypothesis testing and use of personal experience were among the strategies that improved between pre and post assessments.

While frustrated with the task in the pre condition, she enjoyed the task during post testing. As well, her tendency to miss clues in the pretest condition was helped by her scanning strategy in the post test condition.

Her scores improved from pre aloud to aloud pre and to aloud post. These are graphically represented in Figure XXI. Some confidence in the finding that strategy use improved following training is drawn from her improved scores.

Intervention

No outstanding characteristics were observed during the LSET training. Student nine was co-operative, interested and motivated. Indeed, she became more verbal and more self confident during training. It should be remembered that this may be an artifact of the situation. However, students in other groups did not exhibit such improved scores. Student nine achieved 90 percent on the first criteria passage and expressed pleasure with her work.

Overview of LSET Group

The LSET group tended to accept a little more self responsibility for success in both pre and post condiitions than their age peers. However, they accepted self responsibility for failure to the same extent as their age peers.

Generally, teachers saw the students in the LSET group as tending toward use of very little focussed or systematic behavior. A lack of precise language in their communication, failure to generate hypotheses when working on a problem, lacking organizational skills, failing to attend to and clarify directions, and acting impulsively were among the weaknesses highlighted by teachers. However, improvements were noted in all the students on the post intervention rating by teachers.

While little improvement in either the cloze or scrambled sentence passages was observed following the introduction of the think aloud procedure, a clinically significant improvement took place in the cloze passages following the intervention.

Two of the students required a concrete approach to problem solving. However, four and possibly five of the students monitored their performance in the post intervention assessment, an increase of three.

A variety of strategies emerged under pre and post conditions, including use of recall, interpretation, reading ahead, scanning, questioning self and others, use of personal experiences, sensing the mood, use of the main idea, use of semantic and syntactic cues, hypothesis generation and testing, use of visual imagery and use of logical sequence. Following the intervention procedure an improvement in strategy use was observed from both a qualitative and quantitative perspective. For example, the strategy of understanding the main idea as an aid to task completion was used by all five students in the post condition whereas only four students used the main idea strategy in the pre test condition. More significant thanthis slight increase was the observation that this strategy was applied more effectively as evidenced in the scores obtained on the passages. Another example of more effective strategy use that emerged was attempting to verify an hypothesis.

In the peer teaching procedure students in the LSET group,with one exception,tended to be proactive leaders. They modelled the type of instruction they had received during the intervention and attempted to direct strategy use by the younger confederate.

It is important to note that during the final interview and during the training process, three students expressed feelings of being pressured by the LSET technique. However, all but one felt it was useful. Instructors supported this perception in a follow-up interview following completion of the study. Instructor 3 (the retired female teacher) stated that the technique was enjoyable and a "return to what good teaching was all about." None of the instructors expressed a dislike for the procedure. However, three were concerned with the requirements regarding lesson preparation.

Self Instructional Training Group

Student Three

This 18.6 year old female with a full scale IQ of 67 on the Wechsler Intelligence Scale for Children - Revised worked with Instructor Three (the retired female teacher) in the SIT group. All tasks were completed in a co-operative, positive manner.

Stanford Diagnostic Reading Test - Brown Level

No changes were observed on the vocabulary subtest in pre and post assessments. As well, no significant differences on the comprehension test were observed in the pre and post assessments (see Table VI).

Locus of Control Scales

An interesting shift away from accepting self responsibility for academic or more general outcomes took place between pre and post conditions for Student Three (see Table VII). Despite this change, Student Three remained in the high average range for her age peers on the post test in terms of acceptance of self responsibility. The movement on self responsibility for failure between pre and post on the Rotter away from self responsibility for outcomes (see Table VII). while small,was considered clinically interesting. A reason for this shift is not known. However, it may be related to the instructor directed stragegy training used it SIT.

Teacher Ratings

Generally, both the math and language arts teachers perceived an an improvement in the organizational, attending and communication strategies of Student Three (see Table VII).

Improvements did not appear to be so strong according to the instructor's perception. The instructor stated that the student brought a significant number of strategies with her which were refined as a result of the training process. This perception was confirmed by the raters who reviewed the audio tapes of the pre and post assessments. Perhaps the difference of opinion exists because the teachers did not have the opportunity to observe her strategic behavior in the pre test condition. With the completion of training Student Three began asking more clarification questions which focussed the attention of her teachers on this aspect. This possibility was confirmed by the teachers in a follow-up discussion.

Introspection Passages

Student Three appeared to have difficulty with the introspection passages. She ignored the period in the aloud pre condition, preferring to read on until she was ready to stop and restate the information. As with her performance on the idea units, this student had excellent text specific recall.

Among the strategies of rereading, restating, summarizing and interpreting, Student Three would sense the mood of some passages. While she stated that she did not like the think aloud procedure, she stated that reading about being trapped in quicksand made her feel cold.

While self and instructor questioning strategies emerged during the post testing condition, no other differences between pre and post were observed. The questioning of the instructor strategy was not used in any of the pre assessment conditions and was not a part of her in-class behavior. It seemed to emerge following traning and may be related to the instructor-imposed plan used in the SIT procedure. Also, this may account for the shift in locus of control.

Scrambled Sentences

Student three consistently, in both pre and post conditions, first read all the cards, then she would select the first and last card, followed by selection of the middle cards. In selecting the middle cards, she would use logical order, interpret the sequence of events, scan over the cards and reread.

Retrospective clarification questions elicited the comment that "it makes sense".

While no differences emerged in the type of strategy from pre to post, it was interesting to observe that the strategies while used with confidence did not result in a great deal of successes. She scored 0 on the pre aloud, 1 on the aloud pre and 4 on the aloud post (see Figure XXII). It appears that Student Three knew and used a nuber of strategies. However, this use of the strategies was not effective in the scrambled passages. Perhaps she did not monitor her progress. As well, use of the strategy of selecting the first and last card may have interfered with her progress.

The low score on the scramble sentences is all the more surprising given her statement that she reads a lot of comics. Perhaps these materials were too easy for her and her motivation waned. This was not apparent to the instructor.

Cloze Passages

Unlike the scrambled sentences, Student Three performed significantly better on the cloze passages. Significant gains from pre aloud to aloud pre to aloud post were made (see Figure XXIII). These gains were attributed to the introduction of the think aloud procedure and the intervention.

As well, some differences in strategy use emerged between the pre and post measures. For example, Student

Fig.22. Performance of Student 3 on Scrambled Sentences

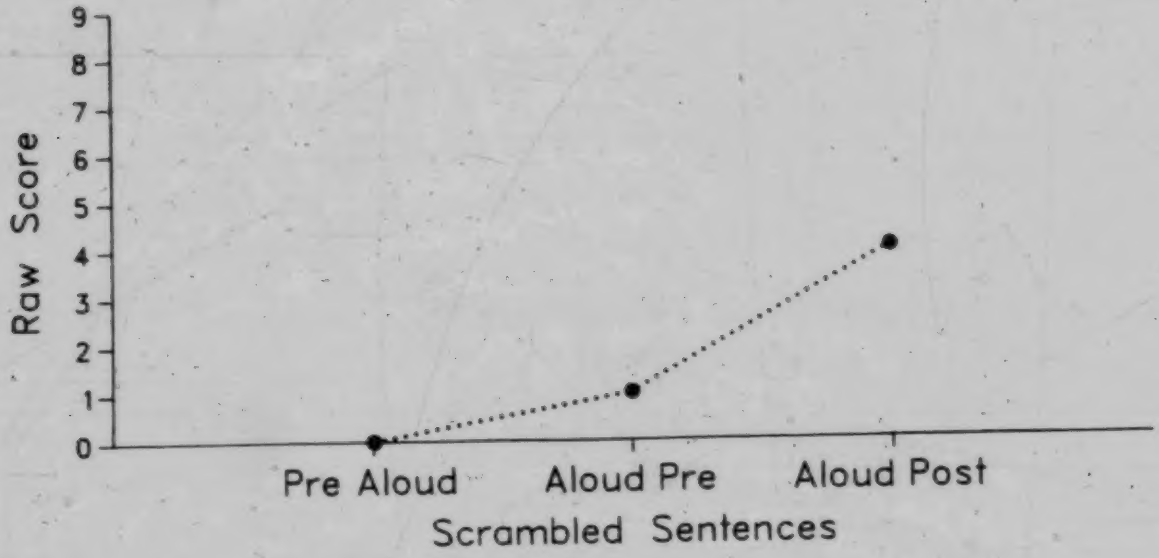
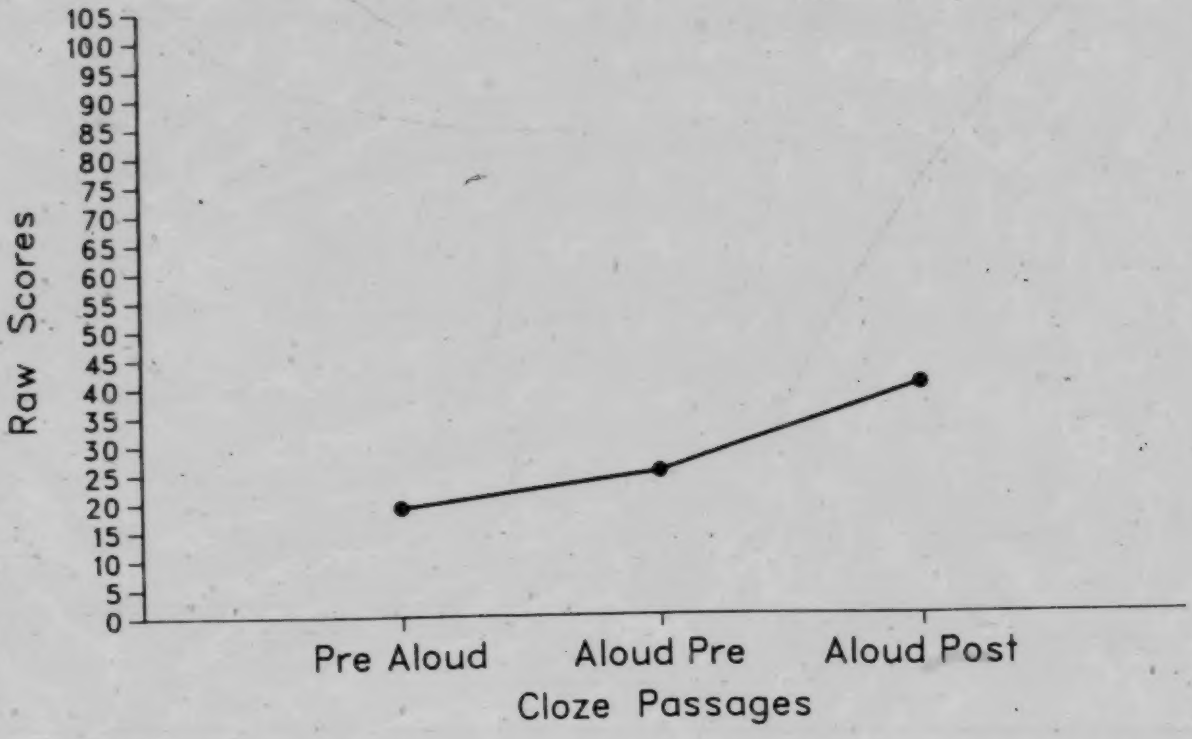


Fig.23. Performance of Student 3 on Cloze Passages



Three did not read ahead in the pre condition, nor did she question the instructor. Further, she dropped use of comments such as "it sounds right" and "it popped into my head" during the post condition. A wide range of strategies were elicited in both the pre and post conditions. Specifically, the student utilized syntactic and semantic cues, rereading, summarizing and interpreting and logical sequence. Use of the main idea of the story was a particularly well developed strategy. It appeared that student use of the strategies became more effective in the post test condition. However, as with findings in the introspection passages and scrambled sentences, student three did not appear to be able to consistently effect a correct answer despite use of an appropriate strategy.

Intervention

No outstanding characteristics were observed during the SIT training. Student three was co-operative, interested and appeared motivated. She did not become more verbal as the study progressed, nor did she become more confident. Some tendency to look to the instructor for aid appeared to develop. This finding coincides with the finding of a switch to a more external locus of control as measured by the Rotter and in the IAR. An improvement in the effective use of strategies was observed. As well, some improvement in the type of strategies used was noted. However, this did not consistently translate into improved performance on tests. She achieved 90 percent on the first criterion passage.

Student Seven

This 17.6 year old male with a full scale IQ of 69 on the Wechsler Intelligence Scale for Children–Revised worked with instructor 2 (the housewife) in the SIT group. While no outstanding physical, social, emotional, cultural or sensory characteristics surfaced in the review of his school files or in consultation with school counsellors, Student Seven displayed a high level of frustration with a number of the tasks. Rapport between the student and the instructor was excellent during the assessment and intervention phases of the study. With the exception of the idea units, peer teaching and final interview all tasks were completed as required. Student seven did not wish to participate in the peer teaching and was unavailable for the final interview.

Stanford Diagnostic Reading Test–Brown Level

A slight clinically non significant gain on the vocabulary subtest between the pre and the post test situations was observed. On the comprehension subtest a gain of 5 months was recorded (see Table VI). The gain in comprehension was considered clinically significant following a review of teacher and instructor perceptions relative to organizational strategies.

While there may be many reasons for the gain it is hypothesized that the gain resulted from a combination of the think aloud procedure and the SIT intervention given his enhanced strategy use from pre to post conditions.

Locus of Control Scales

No differences were observed from pre to post on either the IAR or the Rotter. On the IAR Student Seven accepted self responsibility for his academic successes and failure at about the same rate as his age peers. However, Student Seven perceived more global outcomes to be somewhat beyond his control scoring well above average for his age peers (see Table VII).

Teacher Ratings

Both the math and language arts teachers perceived an improvement in the approach to academic problem solving taken by Student Seven (see Table VII). In the pretest condition the teacher indicated a tendency to perceive Student Seven as lacking clarity in communication, failing to focus his attention and failing to proceed in a systematic manner; all of which were confirmed by the instructor.

However, perceptions by both the math and language arts teachers of Student Seven on the teacher rating scale were improved following completion of the intervention (see Table VII). While there are a number of possible explanations for this gain, it was concluded that the procedures of stopping to think aloud, and being trained to consider what one is doing prior to proceeding had a positive impact on Student Seven.

Introspection Passages

During the aloud pre condition Student Seven did not demonstrate spontaneous think aloud behaviors despite repeated training sessions and reminders. Frequently, he would skip over dots. The four strategies utilized in the passages were self questioning, reference to personal experiences, and attempts at interpretation and visual imagery.

In the aloud post assessment, Student Seven asked clarification questions of the instructor and made attempts at hypothesis generation. However, he did not verify the accuracy of his hypotheses. Use of main idea identification also emerged as a new strategy. It was applied in two of the three stories.

Two comments revealed some interesting attitudes and background information about Student Seven during the aloud post introspection passages. He stated that he had a short memory and could not deal with long stories. Secondly, he became very upset with the passage on superstitions. He expressed displeasure with the passage and the concept of luck. Specifically, he was concerned over the role of God and witchcraft. He stated, "If you believe in luck, you don't believe in God." It appeared that Student Seven believed general outcomes were a part of God's work and luck had nothing to do with those outcomes.

It is interesting that his think aloud verbalizations improved in the post test condition.

Scrambled Sentences

In the pre conditions, Student Seven in response to retrospective questioning often stated that "it sounds right." He did not provide many introspective verbalizations despite prompts and urging by his instructor. There was a limited use of attempts to define a logical sequence in the cards. As well, at least one attempt to use a semantic clue was observed. Scanning forward was also used as a strategy.

During post testing, self monitoring was used. He stated, "This is a tough one!" and "Wow, hold on here...this is not right." Despite these statements, which indicated monitoring, his performance did not improve from aloud pre to aloud post. However, the addition of think aloud resulted in a gain from 1 of 9 in the pre aloud condition to 5 of 9 in the aloud post condition (see Figure XXIV).

It would appear that Student Seven could verbalize using strategies under both introspective and retrospective conditions. However, the strategies did not result in improved performance. Further the strategies were not used consistently nor were they used appropriately.

With the exception of reading ahead, Student Seven tried to use logical story sequence and responded with "it sounds right" to most of the retrospective questions in the post condition.

No real change of any clinical significant was evident between pre and post.

Cloze Passages

As with other students, the cloze passages elicited a large number of strategies. However in both the pre and post conditions the strategies did not result in improvements in accuracy with the possible exception of the introduction of think aloud (see Figure XXV).

Included in the aloud pre condition was the use of a scanning forward technique (the instructor felt this was not meaningful); use of reference to personal experience (this tended to detract from his efforts to comprehend the story); use of reading ahead leaving out blanks he could not complete; use of a semantic clue (once); use of visual imagery in the case of the story on the whitetail deer; sensing the mood of the story (only once in a section dealing with baby deer); developing hypotheses but failing to verify their correctness (the instructor learned through retrospective questioning that he did not know what an hypothesis was, nor how to verify its validity); and, questioning himself (this did not result in directed behavior to find the answer). In response to further

Fig.24. Performance of Student 7 on Scrambled Sentences

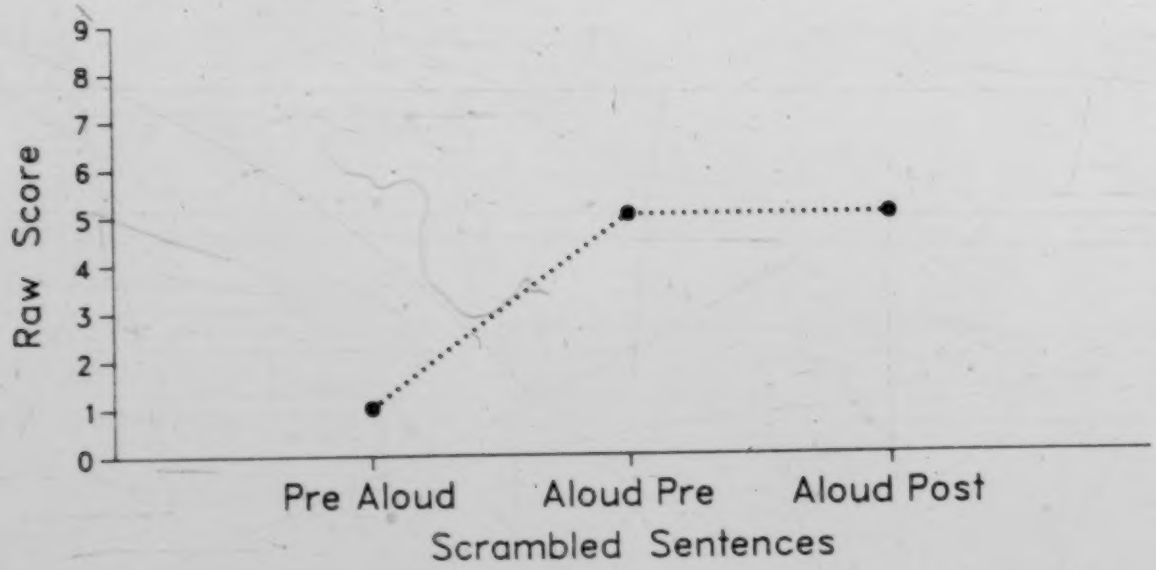
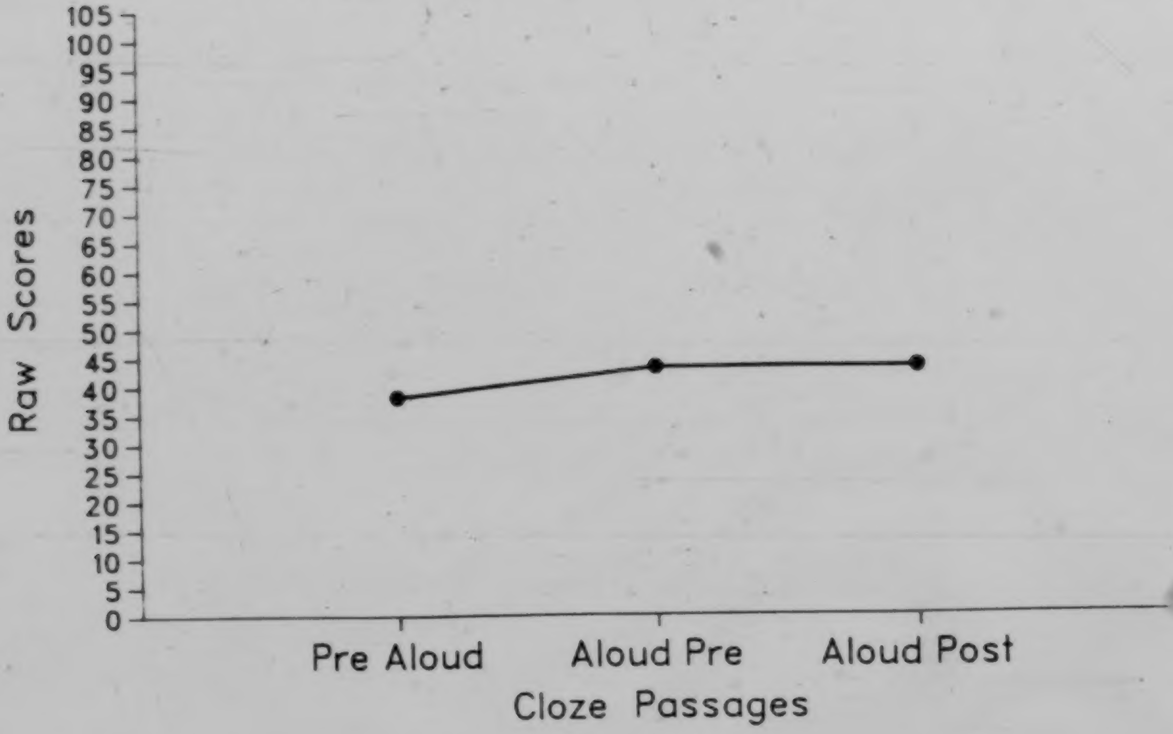


Fig.25. Performance of Student 7 on Cloze Passages



retrospective questioning, Student Seven frequently responded with "I don't know", "It popped in my head", or "It sounds right."

Post testing revealed a slightly more meaningful use of the strategies. However, this did not result in improved performance. While the scanning strategy improved to include scanning backward, it was non productive. As well, use of a logical sequence strategy that surfaced in the scrambled aloud pre condition was repeated unsuccessfully in the cloze aloud post condition. Some attempts at hypothesis generation as per the introspective post session were observed. Again, these were not verified.

While Student Seven had a repetoire of strategies, some of which resulted in correct selection of a word in both pre and post conditions, retrospective questioning revealed that in approximately seventy percent of the cases he did not know why or how he had selected the word. It appears that the strategies and their use were not monitored and were simple verbalizations on a sporadic basis. While there was some slight improvement in the post test condition, this was limited. Perhaps the salient finding that Student Seven did not regularly monitor his work effectively could be gleaned from his comment "Bang! I hit it right on the button again." This comment was made at least three times when an incorrect word was selcted and twice upon selecting the correct word.

Intervention

Student seven was very enthusiastic and pleased with the SIT procedure. However, repeated attempts by the instructor to help him retain the steps in the procedure failed. Because too much extra time was being consumed, the author advised the instructor to try the first criterion test despite a lack of mastery over the steps. An 80% accuracy score was obtained on the first criterion test. Further attempts to learn and restate the key steps in the process were not successful. In total two extra training periods were used to no avail. Despite this, the aloud post testing procedure was undertaken. It would appear that the statement by Student Seven that he had a short memory was accurate. With these exceptions, training proceeded as per the standard routine.

Student Eight

This 16.11 year old male with a full scale IQ of 61 on the Wechsler Intelligence Scale for Children-Revised worked with instructor 5 (the retired male teacher) following random assignment to the SIT group. While Student Eight was very slow in his work, rapport was well established between the instructor and the student. With the exception of the main idea unit selection, Student Eight completed all tasks in a positive cooperative manner.

Stanford Diagnostic Reading Test-Brown Level

Gains were recorded on both the vocabulary and comprehension subtests (see Table VI). This type of movement may be accounted for by the normal test retest fluctuation in scores. However, some facet of the training may have assisted in the improvement. With regard to the comprehension score, it may be that the gain was the result of the think aloud procedure coupled with SIT training. This interpretation is based on the fact that his cloze passage scores increased following completion of training in the think aloud procedure. However, the gain was not supported by gains in the cloze passages, following training, in teacher ratings, in the perceptions of his instructor, nor by the raters who reviewed the tapes. Therefore, the best guess is that the result is one of a chance factor.

Locus of Control Scales

While no change was recorded on the IAR relative to the self acceptance of responsibility for academic achievement, a small shift away from perceiving more general outcomes resulting from external factors was recorded (see Table VII).

Generally, Student Eight accepted self responsibility for his successes and failures according to the IAR. However, he did not accept self responsibility for general outcomes in life on either the pre or post administrations of the Rotter (see Table VII).

While the IAR was within the average range for his age peers, scores on the Rotter tended toward an external locus of control. It may be that some unknown extraneous factor affected his Rotter score, but did not affect perceptions of academic achievement.

Teacher Ratings

Generally, no differences in the perception of problem solving strategies were noted by his math or his language arts teachers. A high consistency between pre test and post test scores was recorded (see Table VII). This indicated that prior to and following intervention, teachers perceived Student Eight as lacking organizational skills, failing to focus his attention and failing to utilize clarity in communication.

Introspection Passages

The most common introspective response made by Student Eight following a dot in the aloud pre condition was to stop and restate or reread the line. On one occassion use of a semantic clue was used, but not recognized. Hypothesis testing was used on approximately five occassions, but the hypotheses were not verified.

Following training Student Eight continued to use restatements and to reread. In addition, he added a strategy of attempting interpretations, a strategy used in the aloud pre cloze passages. However most of his interpretations were incorrect. Even when correct, Student Eight in response to retrospective questioning did not recognize that he had made a correct interpretation. This was a consistent finding across scrambled sentences and cloze passages.

Scrambled Sentences

In the aloud pre condition, the only strategy to emerge was one involving rereading. A slight improvement from pre aloud to aloud pre to the aloud post was observed (see Table VI and Figure XXVI). In the post assessment Student Eight continued to use the rereading strategy but added an attempt at determining the logical sequence of events. While he recognized that an error had taken place, he did not know how to correct the cards, falling back into his rereading strategy. Perhaps the training had some limited effect, but lacked sufficient internalization to be used confidently and effectively. Use of attempts at interpreting the main idea of the stories as in the aloud post cloze assessment condition also emerged sporadically. For example, the student would state, "This one's about King Kong...".

Cloze Passages

Strategies common in the aloud pre test phase of the cloze passages included rereading, one attempt at interpretation and one use of a semantic clue. Student eight lacked a variety of strategies and lacked a spontaneity in introspective think aloud conditions. In response to more direct retrospective questions, Student Eight would state, as a reason for selecting a word, that "It popped in my head" or "it sounds right."

A key question regarding Student Eight which arose in each assessment condition and during the intervention concerned the verbal abilities of this student. In many ways he was similar to student five in the LSET group. Yet, he also lacked determination and the intervention did not interest him as in the case of Student Five. His teacher did not indicate any differences in his verbal ability from other students.

Was the lack of progress by Student Eight related to a lack of monitoring, a lack of verbal ability, or a combination of these and other factors? It is hypothesized that a lack of monitoring skills, a lack of verbal ability and a lack of ability to integrate material combined to limit the progress of Student Eight. While he attempted to monitor his performance, he lacked the strategies to confirm and correct an error, and he lacked the abstracting ability necessary to integrate material.

In the post condition, he dropped reference to "It sounds right" and "It popped into my head." He continued to use a rereading strategy, began asking the instructor for help in clarifying aspects of the story, attempted to relate some of the stories to personal experiences and tried to expand on the strategy of interpretation and use of semantic cues. However, he could not explain what was meant by a semantic cue meant.

Fig.26. Performance of Student 8 on Scrambled Sentences

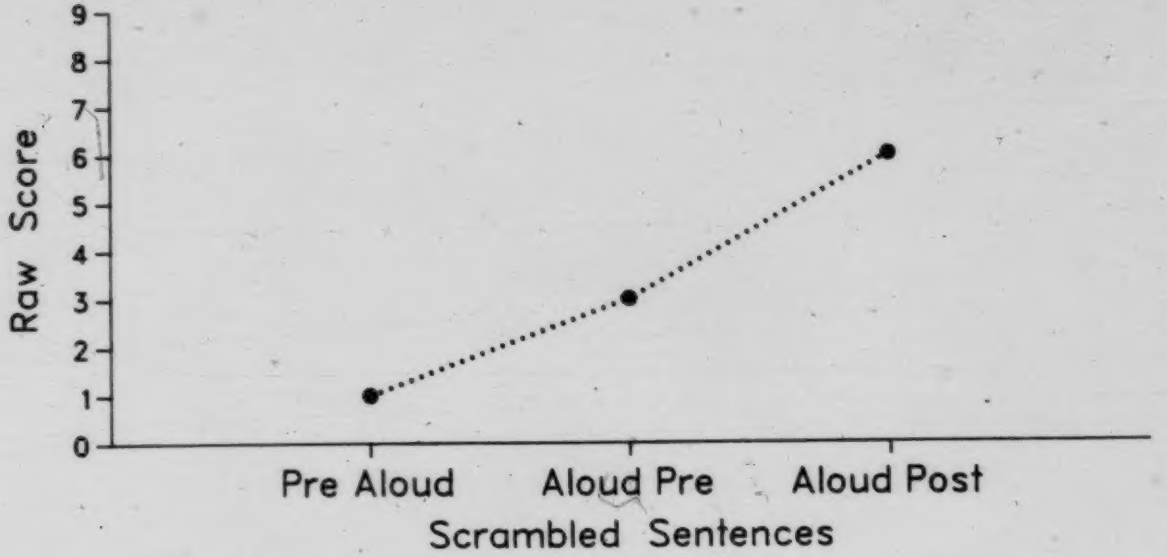
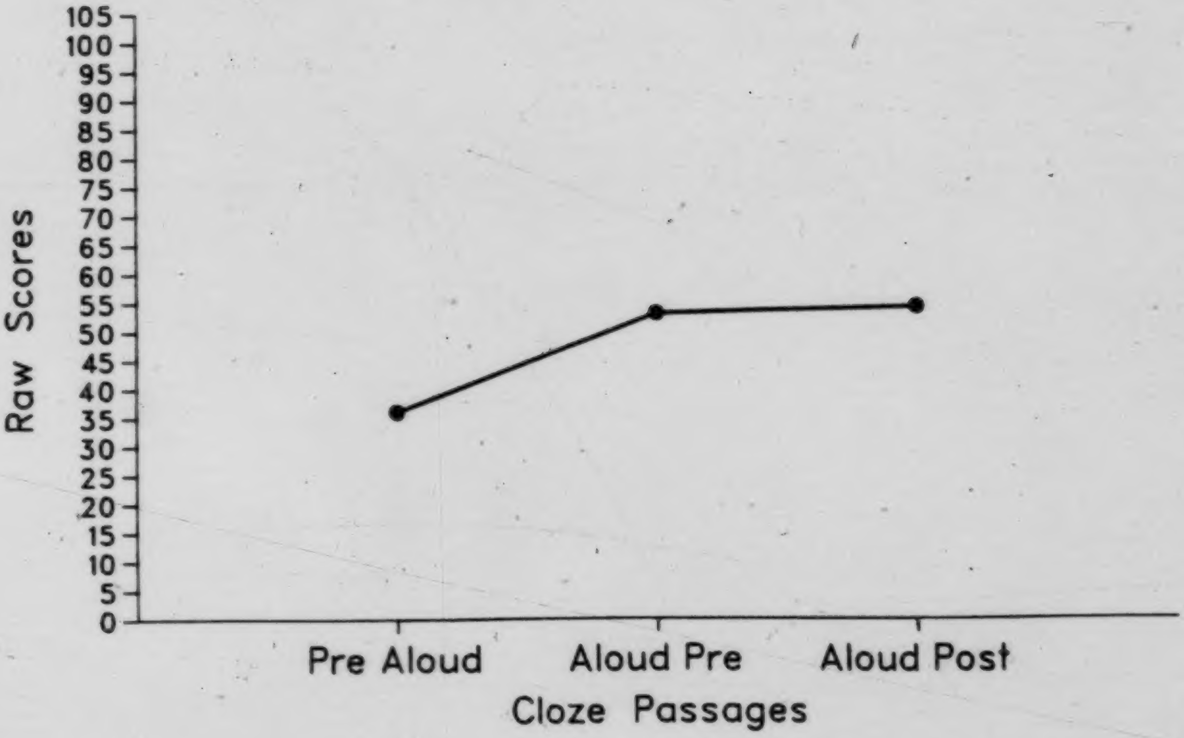


Fig.27. Performance of Student 8 on Cloze Passages



Despite these refinements which were considered clinically significant, little difference in his aloud pre and aloud post test performance was observed (see Figure XXVII). However, a significant gain took place following the think aloud training.

Intervention

No outstanding characteristics were observed in the training program. Student eight had trouble using think aloud/introspective verbalizations all through the program. This difficulty made instruction in self instructional training more difficult. Nevertheless, the student learned the steps and achieved 90% on the first criterion passage.

Author's Comment

While most of the students appeared to be of a similar ability, it is beleived that Student Eight who scored an IQ of 61 had a lower potential than indicated. While pre testing, school record review and staff perceptions did not reveal or confirm this suspicion, it is held that a real difference in potential did exist for this student.

Student Ten

This 16.11 year old female with a full scale IQ of 60 on the Wechsler Intelligence Scale for Children - Revised was in her fifth year at L.Y. Cairns School. She was randomly assigned to work with Instructor Four (the unemployed teacher) in the SIT group. With the exception of the idea unit selections, she completed all assigned tasks in a positive co-operative manner. Rapport with her instructor was well established.

Stanford Diagnostic Reading Test - Brown Level

While a drop of one month was observed on each of the vocabulary and the comprehension subtests, no changes of a clinical or statistical significance were observed with regard to her global reading (see Table VI).

Locus of Control

The Rotter scores indicated that Student Ten perceived general life events to be controlled by factors external to her. This perception increased from the pre assessment to the post assessment (see Table VII). However, according to the IAR, Student Ten accepted self responsibility for her academic successes to the same extent as would her age peersin both pre end post conditions. With regard to self responsibility for academic failures, Student Ten accepted less self responsibility than her age peers (see Table VII).

Teacher Ratings

Pre and post intervention ratings of Student Ten by both her math and language teachers were consistent (see Table VII). With the exception of the rating provided by the math teacher of Student One, Student Ten was perceived as having the most organizational strategies of the group in the study. She was perceived as being relatively focussed, paying attention to directions, and as attempting to plan her work.

However, she was also one of the weaker academic performers of the group in her school work. Her performance on the cloze passages also was one of the weakest, exceeded only by one other student in the pre aloud condition. In the aloud pre and aloud post conditions of the cloze she was the weakest. As well, she was a very quiet student who required more than the typical number of prompts in order to proceed with her introspective and retrospective responses. This was confirmed by her instructor, by the raters of her tapes and by her performance on the peer teaching component.

Her positive rating for organizational strategies was not confirmed by her instructor or by the raters who reviewed her audio tapes. It is suspected that her quietness contributed to the perception of being organized and focussed in her attention.

Introspection Passages

Few if any strategies emerged in these passages. Student ten would read the sentence, stop at the dot and wait. When asked what she was thinking, she would look at the line. Sometimes she would ask the instructor the meaning of a word, reread the sentence, state what the line was about or simply sit and wait. The instructor had to prompt her to move on in sixty percent of the cases.

Questions on the passages to determine her recall and grasp of the story indicated that she did not understand abstractions, metaphors or that sayings such as "break a leg" really meant good luck. She appeared to be very literal and concrete in her thinking. When asked what the passage was about, Student Ten would give one or two ideas that appealed to her and end each summary with "and...and...and".

No differences between pre and post intervention measures were observed.

Scrambled Sentences

Student ten read each card carefully in isolation. Then she rearranged the cards without verbalizing her thoughts. She indicated completion of the task without rereading the finished product.

In the post testing, Student Ten still read the cards in isolation and tried to rearrange them. However, this time in response to extensive probes she indicated that she was trying to get them to fit together. Some attempts at interpretation and a rereading strategy emerged. The training and the think aloud procedure may have contributed to the increase in performance from pre aloud to aloud pre to aloud post as depicted in Figure XXVIII.

Fig.28. Performance of Student 10 on Scrambled Sentences

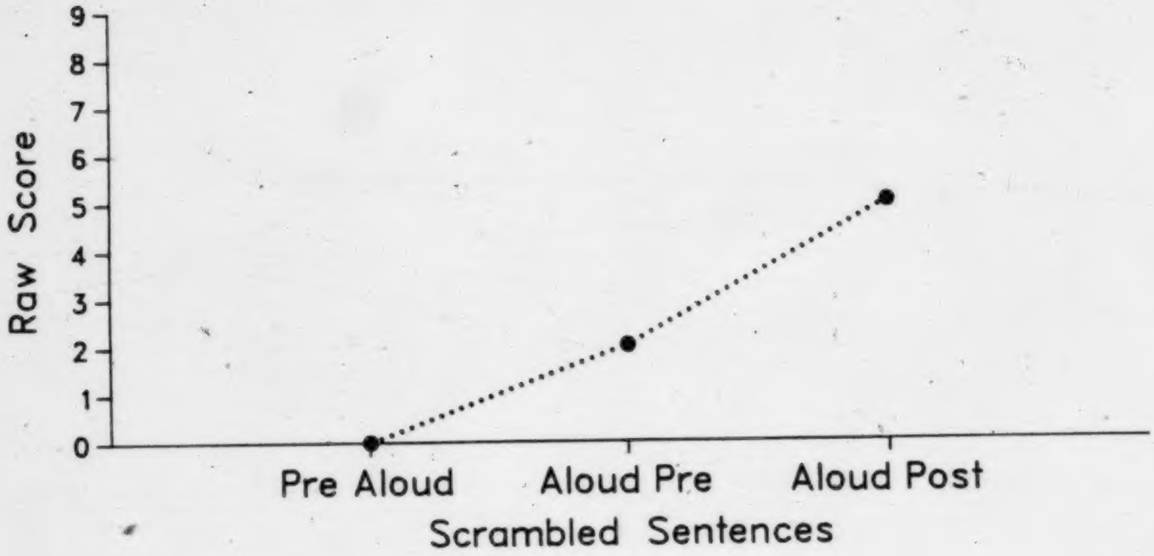
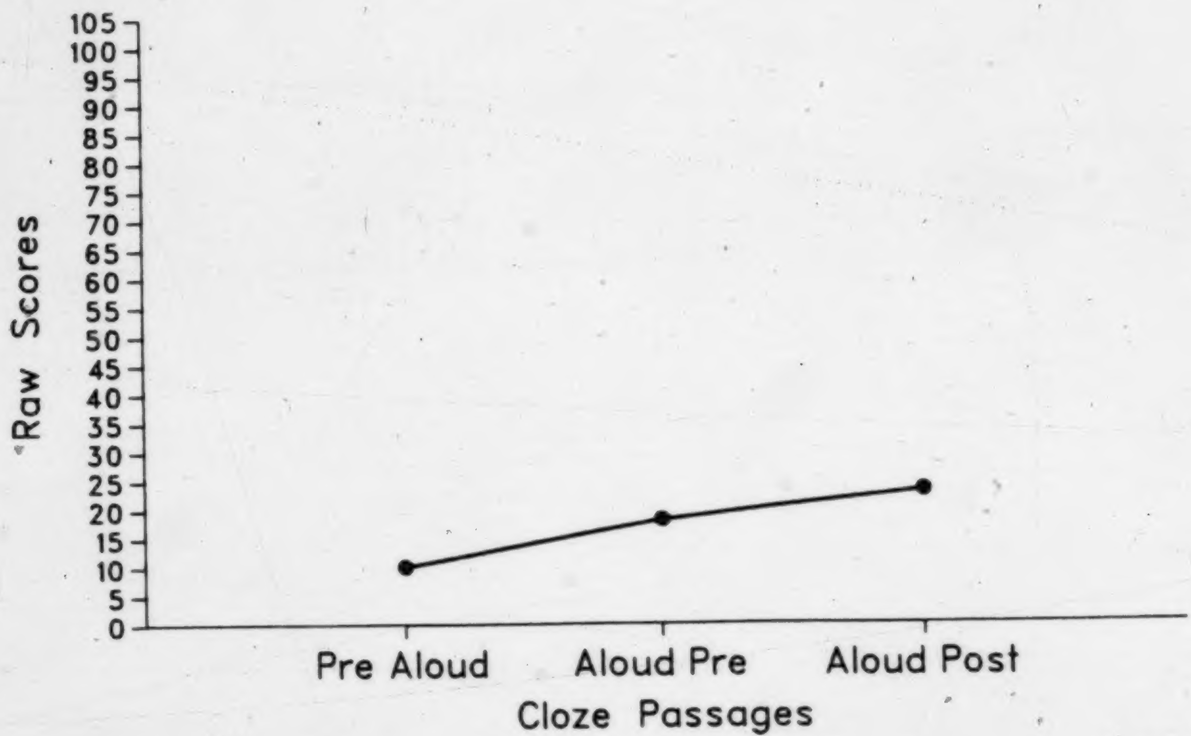


Fig.29. Performance of Student 10 on Cloze Passages



Cloze Passages

In an attempt to ensure the most effective use of this task, the instructor provided three practice sessions. It appeared that the student did not grasp the concept of think aloud in combination with the cloze procedure following the first practice session. Two additional sessions were necessary. The extra training may have contributed to the increase in raw score from in the pre aloud condition in the aloud pre condition (see Figure XXIX).

In the aloud pre condition, Student Ten was determined to finish the passages and spent approximately two hours on each one. With the exception of Student Five in LSET, no other student spent more than thirty to forty-five minutes on each passage. While Student Ten became frustrated with the task, she persevered to completion.

Strategies emerging in the aloud pre condition included rereading and reading ahead. It was interesting to note that Student Ten did not grasp the main idea of the passages. This interfered with her successfully completing the blanks in many of the stories. For example, in a passage about penguins one line said, "of all __________, the Adelie is....". Student ten inserted the word "people" in the blank. When questioned as to her reason, she replied that people travel so she selected people. Despite repeated questions, prompting and leading regarding the topic of penguins, Student Ten did not change her answer. However, in another passage she correctly used and defended the word "pounds" based on a semantic cue.

The post assessment revealed only one new strategy, that of asking the instructor for help. While no help was given, positive responses were made. Her performance increased from the aloud pre to the aloud post assessment (see Figure XXIX).

Intervention

The training sessions proved very difficult for Student Ten. She had difficulty verbalizing the steps in the SIT procedure. However, she did retain the steps with the help of the mnemonic used in the SIT procedure following an extra training session. As well, she achieved 90 percent accuracy on the first criterion passage. This was surprising given her difficulty during the pre and post assessments. However, the criterion task was one of responding to specific comprehension questions. This may have assisted her in organizing and retrieving information. The instructor reported that she appeared to read and reread the criterion passage. She did not appear to use any of the organizational strategies provided in the training.

Authors Note

This student had the lowest full scale IQ of the fifteen students. While not confirmed in a review of her school records or in consultation with her teacher, it is held that she had less potential to benefit from instruction. As well she did not respond well to either the introspective or retrospective procedures.

Student Fourteen

This 16.11 year old female with a full scale IQ of 68 on the Wechsler Intelligence Scale for Children - Revised was in her fifth year at L.Y. Cairns School. She was randomly assigned to the SIT group and worked with Instructor One (the author).

While no outstanding emotional, social, cultural, physical or sensory characteristics were detected in a review of her school records or from discussions with school counsellors, she learned about half way through the study that her mother was dying as a result of a rapid onset of cancer. She decided to continue with the study. However, she was upset by this news. It is not known what effect if any this had on her performance. It appeared to the instructor that following the learning of her mother's condition that Student Fourteen had days when her interest and motivation in the tasks were not as high as previously indicated. As well, she missed a number of sessions and periodically asked to talk about the possible death of her mother with the instructor. This caused some tasks to remain uncompleted as the school year was coming to a close. As well, follow assessments spread over a longer period of time foll following the intervention. It is not known what effect if any this extended period of aloud post assessment had on her results.

The idea units were not completed due to the frustration Student Fourteen experienced with the procedure. With the exception of peer teaching and the final interview in which Student Fourteen did not want to participate, all tasks were completed in a positive co-operative manner.

Stanford Diagnostic Reading Test - Brown Level

A clinically significant drop in performance in comprehension from pre to post was recorded (see Table VI). While the exact reason is not known, it was associated with the health of her mother. As she had indicated, some days were more difficult to deal with than others. Completion of this task may have taken place on such a day. This drop in performance was not found on other tasks, Her vocabulary scores requiring less concentration and motivation did not drop as much (see Table VI).

Locus of Control

It was surprising to note that on the Rotter Student Fourteen accepted so much responsibility for general outcomes (see Table VII). While this score was considered average for her age mates, it was anticipated that the health of her mother and her questioning why it had to happen would reflect a shift towards factors beyond her control in the post intervention assessment.

She scored in the average range on the IAR with regard to accepting self responsibility for success and for failure (see Table VII). However, some shifting towards less responsibility for her failure and more for her success was revealed during post testing. This finding corresponded with verbal comments made by Student Fourteen to the instructor. Specifically, she stated that she felt her school performance would be dropping because of the illness of her mother. Further, she stated that if she was able to hold up it would be because she was strong. In other words, her grades may drop because of a problem external to her, but if she could do well, it would be because of her strength.

Teacher Ratings

Given the conditions under which Student Fourteen was living at the time of the study, it is surprising to find a relatively consistent pre-post rating by both teachers. Generally, she was rated by both her math and her language arts teacher as lacking clarity in communication, failing to attend to directions, failing to focus on her work and failing to establish a systematic work plan (see Table VII). These views also were held by the instructor. However, the instructor felt some improvements were noticable in the post assessment period.

Introspection Passages

While prompting on introspection was necessary, Student Fourteen provided a number of insights into her functioning in both the pre and post assessment conditions. Also, it was discovered that she could not follow across lines without the aid of her pen. While she had never used an aid to follow lines previously, resulting in repeated shifting of the focus of her vision from line to line, the introduction of her pen as an aid to following where she was reading helped. It is interesting that this was not recorded in her file, nor had it been observed by her teachers.

Strategies that emerged upon presentation of the dot included rereading, scanning ahead, attempts at interpretation and hypothesis generation. No attempts at hypothesis verification were recorded in the pre condition. In the post condition these same strategies emerged with the addition that she attempted to verify two of her hypotheses and she attempted to summarize at the end of each paragraph -- a part of the traning package.

Scrambled Sentences

At one point in the pre aloud condition, Student Fourteen said, "This is amazing, I never thought I could do any of these." For whatever reason she did not succeed after that point nor on the aloud pre or aloud post conditions. Figure XXX provides a graphic view of her results.

It is not known why this drop in performance took place. She used strategies such as scanning the cards,

Fig.30. Performance of Student 14 on Scrambled Sentences

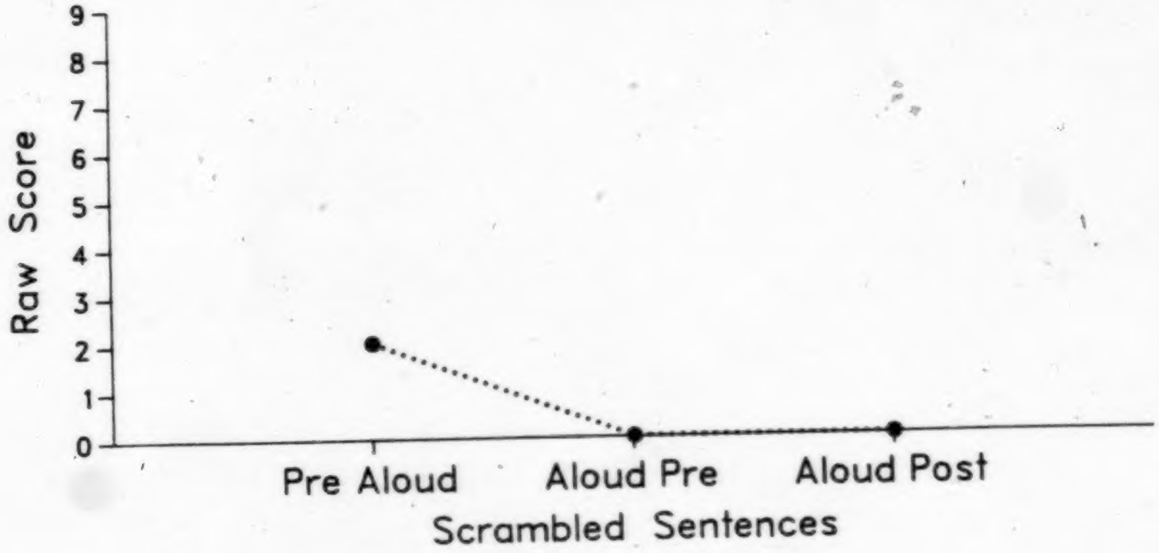
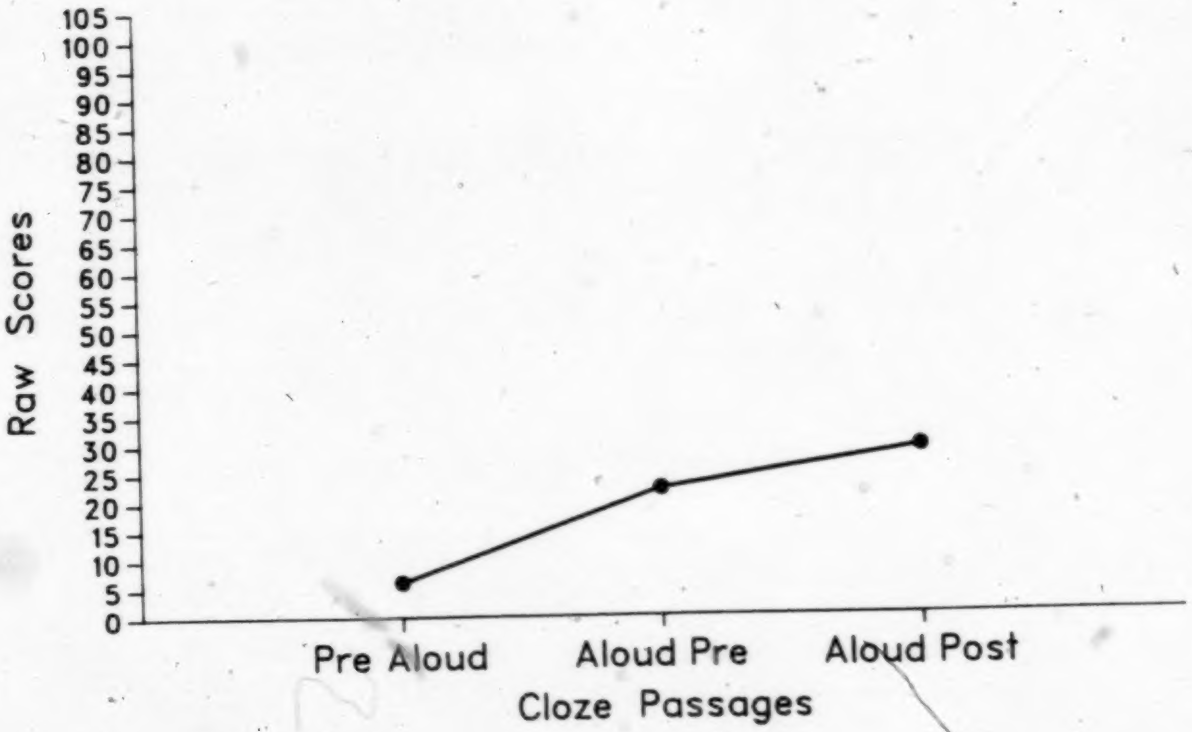


Fig.31. Performance of Student 14 on Cloze Passages



reading, attempting to order the cards based on a logical progression, and sound/symbol associations in the aloud pre test. As well, in the aloud pre and post test she had used attempts at figuring out the main idea, all without a demonstratable success. This was very frustrating for her.

Cloze Passages

Scores across the pre aloud, aloud pre and aloud post as depicted in Figure XXXI indicated some gain in performance, particularly with the addition of the think aloud procedure.

Use of self questioning, reading ahead, attempts at interpretation and use of personal experience were among the strategies that emerged in pre testing. As well, in response to retrospective questioning, she would often state that "it sounds right" or "it popped into my head". On two occasions, she indicated that she was monitoring the difficulty level of the story by making comments such as, "Boy, this is a hard story".

In the post test situation, she utilized the same strategies with somewhat greater frequency. She dropped the use of "it popped into my head" but retained "it sounds right". Student fourteen added use of the main idea and hypothesis verification to her strategies in the post test. While a part of the training procedure, this strategy was within her repertoire in the aloud pre condition of scrambled sentences.

Student fourteen indicated at the beginning of each session whether or not she was up to the activity. On days that she did not feel positive, assessments were not undertaken.

Intervention

The training sessions were completed in a positive co-operative manner. She retained the steps of the SIT procedure on her first attempt and scored 100 per cent in her first attempt on the criterion passage. On the criterion passage she retained and used all the steps such as monitoring herself, using self questioning, questioning the instructor, checking important points and making a summary. With such a high level of performance, her results in post testing were surprising. Perhaps the extra two days of time between training and testing interfered with her retention of the process. However, strategy analysis revealed use of the summary and main idea features in post testing.

Author's Note

For the information of the reader, her mother passed away in August and Student Fourteen moved to Saskatchewan to live with a sister. This was not a positive step for her.

Overview of the SIT Group

The SIT group tended to accept self responsibility for both their academic failures and successes but not for general outcomes. Little change in the pre and post intervention assessments was observed.

Generally, the SIT group was perceived by their math and language arts teachers to be somewhat impulsive, failing to use systematic planning, failing to communicate clearly, lacking a focus in their attention, using trial-and-error responses and failing to clarify directions. A positive shift was observed in the post intervention perceptions by teachers for two of the students.

A clinically significant improvement with the introduction of the think aloud procedure and following the intervention was observed on both the scrambled sentences and the cloze passages.

Both pre and post assessment conditions elicited a variety of strategies. Included were attempts at interpretaion; rereading; restating; reading ahead; scanning; use of personal experiences; visual imagery; main idea; questioning of self and others; sensing the mood; semantic and syntactic cues; and attempts at summarizing. While none of the students in the SIT group was capable of abstract thought, one student monitored her performance in the intervention phase. Two additional students began to monitor their performance following intervention. One change from the pre to the pst assessment that was observed was an

Table XII
Summary of Incidence of Strategy Use By Treatment Groups on Aloud Pre Test Measures

Strategies	Control					LSET					SIT					Total
	1	11	12	13	15*	2	4	5	6	9	3	7	8	10	14	
Restatement	39	23	21	22						11	36		9			161
Recall						3										3
Read Ahead			3	5		4		3				20		2	2	39
Reread	4	4		8	2	6	6	27	15	4	10		1	10	1	98
Look Back		1	1													2
Scanning			9	15				9		10	3	3			8	57
Main Idea		3		1	1		1	2	1	3	5					17
Summarizing			2								6					8
Interpretation	18	15		36	10	22	12	39	43	15	4	20	12	8	24	278
Analogy									1							1
Hypothesizing		4	8	20		10	6	3	5	15		5	3		5	84
Hy. Verification										1						1
Questions Self		1						3	1			2			1	8
Questions Others		1	1	2			12	1						6		11
Per. Exper.		1			6	3	12	1	1			6				30
Logical Sequence		4		5		5					2	3			1	20
Sensing the Mood		1				3					2	1				7
Visual Imagery		2					2	1				1				6
Sound/Symbol															1	1
Semantic Cue			1	1		3		1			4	1	2	1		14
Syntactic Cue											1					1
Sounds Right	8			22			8	10		12	4	3	36		12	115
Makes Sense			14	10							3					27
Popped In Head	2						8	15		5	9	6	10		1	56
Guessing		18						8								26
Total	71	78	60	147	23	55	55	123	67	76	89	71	63	26	56	1071

Table XIII
Summary of Incidence of Strategy Use By Treatment Group on Aloud Post Test Measures

Strategies	Control					LSET					SIT					Total
	1	11	12	13	15	2	4	5	6	9	3	7	8	10	14	
Restatement	40	27	8	27							30		11			143
Recall						4	1									5
Read Ahead			1	1	1	8		18	7	7	11	20		3	1	78
Reread	4	1		4	7	8	19	30	29	20	15		40	25	7	209
Look Back		1	1						2	2						6
Scanning			9	14		10		2	8	17	4	3			6	73
Main Idea		4		3	2	4	8	7	11	9	3	3	3		2	59
Summarizing			3							2	4					9
Interpretation	16	24		30	10	40	12	59	47	42	27		60	30	30	427
Analogy																0
Hypothesizing		1	6	21		15	10	8	10	14		7			7	99
Hy. Verification						10	5	8							5	28
Questions Self		1				5		5	3	1	1	3				19
Questions Others		4	1	1		5		4	4	1	5	9	4	5	9	52
Per. Exper.		2			15	3	29	3	2	1		6	1		1	63
Logical Sequence		3		9		10		6			3	3	2		4	40
Sensing the Mood		2				5			1		3					11
Visual Imagery		1				1	3	1				1				7
Sound/Symbol												1			1	2
Semantic Cue			1	2		1	1	1	2	2	2	2				14
Syntactic Cue											1					1
Sounds Right	7			27			7		3	4		3			12	63
Makes Sense			36	12						3	4					55
Popped In Head	12											12				24
Guessing												2				2
Total	79	71	66	151	35	129	95	152	129	125	113	75	121	63	85	1488

* Subject 15 completed only Cloze Measures and one Introspection Passage

Table XIV
Incidence of Strategy Use on Aloud Pre and Post Test Measures

	Introspection		Scrambled		Cloze		Total	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Restatement	118	220	33	23	7	0	161	143
Recall	3	4	0	0	0	1	3	5
Read Ahead	12	10	1	0	26	68	39	78
Reread	15	29	36	74	47	106	98	209
Look Back	1	1	0	1	1	4	2	6
Scanning	9	1	21	27	27	45	57	73
Main Idea	3	27	1	5	14	27	17	59
Summarizing	8	2	0	0	0	7	8	9
Interpretation	191	295	16	39	71	93	278	427
Analogy	1	0	0	0	0	0	1	0
Hypothesizing	60	34	7	9	17	56	84	99
Hy. Verification	0	15	0	1	1	12	1	28
Questions Self	3	8	0	0	5	11	8	19
Questions Others	14	32	0	0	7	20	11	52
Personal Experience	12	20	0	1	18	42	30	63
Logical Sequence	0	0	16	37	4	3	20	40
Sensing the Mood	1	6	0	0	6	5	7	11
Visual Imagery	42	3	1	0	3	4	6	2
Sound/Symbol	0	6	1	2	0	0	1	7
Semantic Cue	2	2	4	6	6	5	14	13
Syntactic Cue	0	0	0	0	1	1	1	1
Sounds Right	1	0	57	33	57	30	115	63
Makes Sense	0	0	5	55	22	0	27	55
Popped In Head	0	0	4	1	52	10	23	24
Guessing	0	0	0	0	16	2	26	2

increase in student questioning of the instructor, an almost dependency type relationship.

In the peer teaching procedure, students in the SIT group tended to be passive in their teaching style passing on rote type of directions.

The final interview revealed that students felt positive about their experience. It is possible that two of the students in the SIT group has less potential than did other students in the study.

Instructors reported that they enjoyed the rote nature of SIT. In addition, they reported that the mnemonic was a tremendous help in maintaining the strategies. They suggested that the use of a mnemonic be included in the LSET procedure. However, they felt that while SIT was less threating to students it did not increase student verbal behavior and independence to the same extent as did the LSET procedure.

B. Results of Idea Unit Passages

With one exception, none of the students were able to complete the idea unit passages. Typically,the two idea unit passages in the pre aloud condition were completed unsuccessfully resulting in a great deal of frustration for the students. However, instructors carried on with the task such that all students completed one of the passages in the aloud pre condition to determine whether the think aloud process would assist them. Unfortunately, it did not.

Rather than risk the loss of rapport and/or cause an undue degree of frustration for the student, it was decided to discontinue this task.

Only Student Three in the SIT was able to complete all six of the passages. In fact, in all six stories she selected the same twelve idea units chosen by the panel of raters.

While she was reluctant to make a selection and spent an extensive amount of time on each passage (60-90 minutes), Student Three appeared to use the concept of a kernal story referencing the initiating event, attempt and consequence as outlined by Stein and Glen (1975). In addition, she appeared to use main idea of the story to determine the most important aspects in a logical sequence.

In the story on the kettle as with other stories, Student Three would read and reread the passage. Among the other strategies utlized by this student were attempts at interpretation and summarizing. Typically,she would outline the key ideas such as,

> "His wife wanted a kettle, he bought it, he found it heavy, so he left it and his wife had to go get it."

This type of summary indicated that she was able to abstract information and to form conclusions.

No differences in strategies or accuracy was observed across the pre aloud, aloud pre or aloud post conditions.

C. Results of Peer Teaching

Only two of the five students in the control group, three of the five students in the LSET group,and three of the five students in the SIT group participated in the peer teaching situations. Reasons for non participation included illness, absenteeism, and a desire not to work with a younger student.

Students in the control group who did participate tended to be passive,as were students in the SIT group. Students in the SIT group passed along rote types of directions and did not undertake a proactive leadership role with the younger student. In fact, in two cases the experience was not a positive one for the self concept of the student who was acting as teacher. The LSET students as teachers with one exception, were more proactive, pulled their chairs close to the younger student, maintained eye contact, provided proactive leadership to the younger confederate, introduced several strategic behaviors, and in one case modelled the behaviors of the instructor.

D. Results of the Final Interview

The purposes of the final interview were to determine student perceptions of the study, the assessment and instructional processes, their instructors, and to review what had been learned and as well as how it could be applied following the study. A secondary purpose was to provide any follow up such as programming aid that may have been necessary.

Typically the nine students who participated in the final interview expressed positive regard for their instructors and most of the instructional processes. However, some students reported finding some aspects of the asessment prosess boring.

One student in the LSET group who was very positive about the process told of using the reading strategies to help her in her math and in reading novels at home. She reported that this enhanced her status with her sisters since she was now able to discuss these books with them. Another student in the LSET group stated that some of the work had helped him a little, but that the whole process was too long, was boring and that he did not need it because it was too easy.

This declaration represented an important aspect of work with some mentally handicapped students. It provided an insight into the thinking of one student who was experiencing failure as well as insight into how to cope with failure. While the work was difficult and required a high degree of integration, this student stated that it was too easy for him to bother. Being confronted with teaching a younger peer, failing to pass on a large number of strategies and perceiving failure in the presence of a younger student is quite a bit to handle for any person. While this may be an over-statement of the incident, it is important to remember the potential dangers in well intentioned activities.

A third student in the LSET group expressed pleasure with the whole process, felt that she had changed for the better as a result of her involvement in the study, she wished that school could be like this all the time.

Students in the SIT group also were positive about the experience, their instructors and what they had learned. However, it was interesting to observe that none of these students could verbalize the steps in the self instructional training package. No other significant views were obtained from students in the SIT group.

E. Data Synthesis

Research Question 1

What strategies and/or patterns of strategies were utilized in reading comprehension by adolescents labelled educable mentally handicapped and functioning in the grade 4 through 6 reading level?

For the purposes of answering this question, data gathered in the aloud pre assessment condition was utilized (see Table VIII). Other data such as the aloud post data have been influenced by training or some other unknown factor.

A review of the qualitative data in the preceding section along with the aloud pre data in Table VIII indicated that a variety of strategies were utilized by the

EMH adolescents involved in this study.

Included in the strategies spontaneously used by the EMH adolescents in the study were:

1. Restating information read earlier in the story;
2. Summarizing information read earlier in the story;
3. Interpreting information read earlier in the story;
4. Using an analogy to aid interpretation;
5. Using personal experiences to aid in interpreting the story;
6. Using visual imagery to aid in interpreting the story;
7. Recalling information read in a previous section;
8. Reading ahead;
9. Rereading a part of the story;
10. Looking back;
11. Scanning around the page - forward and backward;
12. Using the main idea or central theme of the story;
13. Hypothesizing about the outcome;
14. Checking to verify a hypothesis;
15. Questioning of self;
16. Questioning of others;
17. Using the notion of logical sequence;
18. Using semantic cues;
19. Using syntactic cues;
20. Sensing the mood of the story;
21. Using a sound symbol relationship;
22. Using a guessing strategy;
23. Using intuitive strategies such as "it makes sense", "it popped into my head", "it sounds right".

Of the strategies identified, the following strategies were used by 1 - 5 students in the study (see Table 10).

Using sound/symbol relations (1)
Using an analogy (1)
Recalling information (1)
Checking to verify hypotheses (1)
Using syntactic cues (1)
Using sound/symbol relationship (1)
Summarizing (2)
Using look back (2)
Guessing (2)
Using intuitive strategies such as "it makes sense" (3)
Using visual imagery (4)
Sensing the mood (4)
Questioning self (5)
Questioning others (5)

This indicated that the above strategies were used infrequently by educable mentally handicapped students in the study. A low incidence of use was observed for these strategies as shown in Table XII. This indicated that not only were these strategies used by a smaller number of students, their use was infrequent. The incidence rate ranged from 1 for the analogy strategy to 27 for the intuitive strategy of "it makes sense".

The following strategies were used by 6 - 10 students in the study (see Table X).

Using intuitive strategies such as:
"it sounds right" (9) and
"it popped into my head (8)
Using the main idea (8)
Using semantic cues (8)
Reading ahead (7)
Scanning (7)
Restating information (7)
Using personal experience (7)
Restatement (7)
Using logical sequence (6)

This indicated that the above strategies were used somewhat more frequently than the first thirteen strategies.As well it is important to note that restating information previously read was one of the two most frequently used strategies (see Table XII), the other being attempts at interpretation. Nevertheless,it was used by only seven students in the study. The intuitivbe strategey of "it sounds right" used by nine students was observed approximately 115 times. The balance of these nine more frequently identified strategies were used rather infrequently with highest incidence rate being 58 for the scanning strategy and the lowest incidence strategy (14) being the use of sementic cues. These results were interpreted to mean that while these strategies of reading ahead, questioning self and use of semantic cues exist, they are not highly used strategies by the educable mentally handicapped students in this study.

The following three strategies were used most frequently indicating that these were the most common strategies within the repertoire of the educable mentally handicapped students in the study (see Table X).

1. Rereading (13)
2. Attempting to form an interpretation (13)
3. Hypothesizing about the outcome (11)

A check of Table XII revealed that these three strategies used by most of the students in the present study also were used more frequently. For example, the interpretation strategy was used 278 times, the rereading strategy was used 98 times and the hypothesis generation strategy was used 84 times. It was concluded that these three strategies not only exist within the population but are well established in the repertoire of these students.

In an attempt to summarize and categorize data about the types of strategies used by educable mentally handicapped students in the present study, it is important to note that most of the students (12) in the judgement of the instructors and raters were concrete thinkers (see Table VIII). Only one student who happened to be in the SIT group appeared capable of abstract thought. Three of the students exhibited self monitoring behaviors in the aloud pre test condition, one in each of the control, LSET and SIT groups.

In addition to the types of strategies revealed in the review, it is informative to note that:

1. While thirteen students chose to reread material, seven chose to read ahead, two attempted to summarize information, seven attempted to recall information, eight attempted to find the main idea and four attempted to form a visual image.
2. Thirteen students attempted to interpret sentences, sections or in one case the entire passage as an aid to completing the reading passage. Thirteen students also used the rereading strategy twelve of whom were the same. Seven of the eight who used the concept of main idea also used the interpretation strategy and all eight also used rereading strategy.
3. Finding other overlaps and consistencies across strategies that may be grouped did not seem to exist for these students. For example, while eight students used the main idea as a strategy, only two used a summerizing strategy. The periodic use of a variety of strategies that did not appear pre planned or systematic seems to be the prevailing finding. With the exception of one student who did not complete all the aloud assessments, use of strategies by students ranged from 5 to 13.
4. While this study was not designed to explore the

effective use of strategies, some subjective comments are possible given instructor and rater comments. As well, a review of Table VIII and Table XII offered some insights. For example, eleven students generated 84 hypotheses about certain events, people, animals, sentences or ideas contained in the passages. However, only one of those students who also was the student perceived to be capable of abstract thought and using a self monitoring approach, attempted to verify the validity of her hypotheses.

Generally, it was felt by the instructors and the raters who reviewed the tapes that while educable mentally handicapped students do possess and attempt to utilize a variety of strategies, most do not integrate and in some cases recognize the information gained through the use of the strategy.

Research Question 2

What reading assessment instruments provided information regarding the strategies utilized in reading by educable mentally handicapped adolescents?

Four types of instruments were adapted or developed to identify information relative to strategy utilization by educable mentally handicapped adolescents: idea unit identification passages, introspection analysis passages, scrambled sentences and cloze passages. The results of each is presented.

1. Idea Unit Passages:

With one exception, none of the students could complete this task. While all students attempted to select the twelve lines they would choose to tell a friend about the most important parts of the story, only one was able to select the twelve units. Other students would select too many, too few, become lost with regard to the task direction, cease to try, or become frustrated and angry with themselves, the instructor or the researcher.

Because of the difficulty of the task for these students and the frustration experienced by the students in the pre aloud condition, only one attempt under the aloud pre condition was made. Typically, students would repeatedly ask what it was they had to do, comment "I don't know" or sit quietly, appearing to go up and down the passages. It appears that the task was so frustrating that few if any strategies were verbalized. Reasons for this frustration may have been related to the content of the passages and/or to the required procedure. In the interest of rapport, the task was discontinued.

To be an effective elicitor of strategy use, this task would require significant modification. It was found to be of no value in providing information relative to the strategies used by EMH students in reading.

2. Introspection Passages:

While one student simply read the word "period" and became increasingly frustrated with the presentation of the dot, these passages contributed to the identification of a variety of strategies, specifically nineteen (see Table IX). Included in order of frequency of use were:

- -Interpretation (11)
- -Hypothesizing (9)
- -Restating the sentence (5)
- -Referring to a personal example (4)
- -Reading Ahead (4)
- -Rereading (3)
- -Attempting to formulate the main idea (3)
- -Questioning another person (2)
- -Summarizing (2)
- -Using visual imagery (2)
- -Look back (1)
- -Recalling (1)
- -Scanning (1)
- -Use of the intuitive strategy "it sounds right" (1)
- -Use of semantic cues (1)
- -Using an analogy (1)
- -Questioning oneself (1)
- -Sensing the mood (1)

It is interesting that of the 23 strategies identified in the study and listed in Table IX, the introspection passages did not elicit any guessing and only one intuitive strategies. Hypothesis verification, logical sequence, sound/symbol relations, and use of syntactic cues were not elicited.

While the introspection passages elicited some nineteen types of strategies, incidence of strategy use as shown in Table XIV revealed that only three strategies were distinctly present; restatement interpretation and hypothesizing. It is interesting to note that these same three strategies were the ones used most frequently by students on the introspection passage. In other words, not only were the strategies used by most students, the strategies were most often accessed.

A further review of Tables IX and XIV revealed that the restatement strategy, in particular, was not used by very many students nor was its incidence rate very high on any of the other reading strategy assessment passages.

It would appear that the introspection passages tended to elicit three main strategies, restatement, interpretation, and hypothesis generation.

Most students reported feeling positive about the introspection passages, but had difficulty conceptualizing the relationship of the task to reading. With the exception of the one student who became very frustrated with the task, most students appeared comfortable with completing the passages.

Another facet evaluated with regard to the passages was their usefulness in providing comparisons from pre to post assessment conditions. The introspection passages appeared effective in this regard in that they facilitated the identification of additional strategies in the post condition as well as changes in strategy use (Table IX and XIV-). One example of this was change was the use of hypothesis verification in the aloud post assessment, a strategy not utilized in the aloud pre assessment condition.

A review of Table XIV verified some of the qualitative changes observed by teachers and instructors. For example, the increased attempts at interpreting passages was reflected in an incidence rate increase assisting in confirming the qualitative perception held by instructors that improvement in quality and quantity of strategies took place.

It would appear that the one possible limitation of the introspection passages is their tendency to elicit only three major strategies with low (less than 2) or zero incidence rates in another 13 strategies.

3. Scrambled Sentences:

The use of scrambled sentences of 3, 5 and 7 units length elicited forteen types of strategies and three types of intuitive strategies (Table IX and XIV). Included in the strategies elicited in descending order of use were:

-Rereading (8)
-Using logical sequence (5)
-Using the intuitive strategy "it sounds right" (4)
-Attempting to interpret the sense of the story (4)
-Using semantic cues (3)
-Scanning across the cards (2)
-Restating material read (2)
-Using the intutive strategy "pop into my head" (1)
-Reading ahead (1)
-Using sound/symbol relationships (1)
-Using main idea (1)

While the use of intuitive strategies was observed, the use of a guessing strategy was not. Other strategies not elicited included recall, looking back, summarizing,use of analogy hypothesis verification, questioning self and others, personal experience, sensing the mood, visual imagery, and syntactic cues.

Among the strategies elicited, it was interesting to note that restating materials read may have interfered with sequencing the cards since some restatements altered the intent and logical sequence of the story.

Of the more frequently used strategies only four had a high incidence rating, the intuitive strategy of "it sounds right" the restatement strategy, the rereading strategy and the scanning strategy. The rereading strategy used by eight students was used only 36 times while the intuitive strategy of "it sounds right ' was used 57 times (see Table XIV).

Generally, with the exception of the above strategies, and despite the identification of 13 different strategies, the frequency rate was very low for most. With frequency rates of 2 or less in seventeen of the strategies, little confidence can be held that the passage will elicit these strategies consistently.

Students reported feeling positive about the activity, but could not see the relationship of sequencing to their reading. None of the students appeared to become overly upset with this task. While this may indicate that the task was too easy and did not elicit many strategies a review of Table VI indicated successful completions ranged from 0 to 9 out of 9. As well, a range of scores was found across all three administrations. This is interpreted to mean that the sentences were difficult enough to elicit strategies, but not so difficult as to impede progress. However, a review of Table IX demonstrated that few shifts in strategy utilization between pre and post were observed. While the incidence rate did not change for the rereading,logical sequence,interpretation strategies, and the intuitive strategy of " it makes sense", few other changes were observed. It was concluded that scrambled sentences were not as responsive to change in student work as were other passages according to the instructors and the raters.

In order to determine the correlation of the scrambled sentences developed for this study and the Comprehension subtest of the Stanford Diagnostic Reading Test - Brown Level, a Pearson Product Moment Correlation using raw scores from both tests was calculated. Correlations of.70 for the pre aloud version and.49 for the aloud pre version were obtained. These correlations were statistically significant at the.01 level for the pre aloud pre version and at the.05 level for the aloud pre version (Table XV). This indicated that the

Table XV
Correlations of Scrambled Pre Aloud, Aloud Pre Cloze Pre Aloud and Aloud Pre With The Stanford Diagnostic Reading Comprehension Pre Test

Correlation Coefficients

	4	P	
Pre Aloud Cloze	.58	.011	*
Aloud Pre Cloze	.64	.005	*
Pre Aloud Scrambled	.70	.002	*
Aloud Pre Scrambled	.49	.035	**

* P < .01
** P < .05

scrambled sentences designed for the study were tapping some of the factors addressed in the Stanford Diagnostic Reading Test. It appears that the scrambled sentences task tapped a significant aspect of reading, but not the only aspect.

4. Cloze Passages:

The use of these passages elicited 21 types of strategies, three types of intuitive strategies and a guessing strategy (see Table IX Cloze Pre). Included in the strategies elicited in descending order of use were:

- Intuitive strategy of "it sounds right" (9)
- Intuitive strategy of "it popped in my head" (8)
- Rereading (8)
- Attempting to interpret the sense of the story (8)
- Using personal experience (6)
- Scanning (5)
- Using the main idea (4)
- Reading ahead (4)
- Using semantic cues (4)

- -Questioning self (4)
- -Semantic cues (4)
- -Questioning others (3)
- -Sensing the mood (3)
- -Using visual imagery (2)
- -Using logical sequence (2)
- -Hypothesizing (2)
- -Using the intuitive strategy "it makes sense" (1)
- -Using syntactic cues (1)
- -Verifying hypotheses (1)
- -Summarizing (1)
- -Looking Back (1)
- -Restating (1)
- -Using sound/symbol relationships (0)

As well, 2 persons reported using a guessing strategy.

As expected a variety of strategies were elicited. Reference to Table XIV indicated that the more popularly ulitized strategies observed on the cloze procedure included interpretation, rereading, reading ahead and the intuitive strategies. The cloze passages appeared to provide a rich variety of strategies coupled with a high incidence rates, thereby ensuring a breadth and depth of information across students for qualitative analysis of the 19 strategies utlized only three had incidences rates of two or less.

While four students expressed frustration with completing the cloze passages, most reported feeling positive about the process. Some of the frustration may have been due to the number of passages required in the study. As with the introspection passages, one of the students expressed a great deal of frustration with the passages due to the think aloud procedure.

A review of Table VI demonstrated that a range of scores from 6 - 58 out of 103 was achieved on the pre test with an average of 24.9. On the aloud pre the range changed to 15 - 70 out of 103 with an average of 33.8. The range in the aloud post test was 15 - 71 out of 103 with an average of 44.9. While these passages may have been difficult, the passages did not appear to be so difficult as to lead to frustration and termination. As well, a review of Table IX demonstrated changes in strategy use from pre to post. For example,reading ahead (4 to11),summarizing (0 to 4), and the dropping of the intuitive strategies. This indicated that the passages were useful in reflecting changing patterns of behavior. These changes were supported by teacher ratings of student behavior, by instructor observations and by the qualitative analysis.

In order to determin the correlation of the cloze passages as developed for this study with the Comprehension subtest of the Stanford Diagnostic Reading Test - Brown Level, a Pearson Product Moment Correlation using raw scores from both tests was calculated. A correlation of.64 was obtained between aloud pre cloze and the Stanford Diagnostic Reading Comprehension Test and a correlation of.58 was obtained between the pre aloud cloze and the Stanford Diagnost Reading Comprehension Test. Both of these correlations were significant at the.01 level (Table XV).

This was interpreted to mean that while the cloze passages tapped some of the dimensions of Reading Comprehension found in the Stanford, sufficient variation remained to indicate that these cloze passages also tapped other dimensions of reading.

By way of summary in response to research question 2, the more comprehensive procedures to elicit strategies from educable mentally handicapped adolescents may be the cloze and the introspection passages using a think aloud procedure. While the scrambled sentences did not elicit any additional strategies, use of the procedure is considered worthwhile since it appeared to tap a unique aspect of reading, that of logical sequence. Further research on the idea unit passages as presently constructed and with alternative content is recommended with this population.

It may be that the cloze procedure could stand alone to provide a meaningful overview of strategy use by readers. This conclusion is based on the variety and incidence of strategies elicited in the cloze procedure. It is not recommended that the introspection passages nor the scrambled sentences be used as stand along materials.

Research Question 3

Did the limited exposure to the three intervention conditions (control, LSET and SIT) effect strategy

utilization in reading comprehension by EMH adolescents?

Pre and post intervention measures of reading comprehension (Stanford Diagnostic Reading Test) were compared for each of the three treatment conditions: control, LSET, and SIT in a two (measures) x 3 (treatments) analysis of variance (Table XVI). As can be seen from Table XV, no significant differences were found on pre/post intervention measures on the Stanford between the three treatment groups.

In addition, pre and post cloze and scrambled measures were compared separately for each of the three treatment conditions: control, LSET and SIT in a 2 (measures) x 3 (treatments) analysis of variance (Table XVII). No statistically significant differences were noted between the groups on either of the measures, the gain between aloud pre and aloud post on the cloze measures approached statistical significance at the.05 level. Figures 32 and 33 graphically present the results of achievement across aloud, aloud pre and aloud post assessment conditions. The hetrogeneity of the students on the scrambled sentences is readily noticable in Figure 32. As well the clinically significant gain by the students in the LSET group is presented in Figure 33.

Based on the qualitative analysis outlined in the 15 case studies it appeared that little change took place in the use of strategies by students in the control group.(Table X Control pre/post strategy measures).

Fig.32. Performance of CONTROL, LSET and SIT Groups on Scrambled Sentences

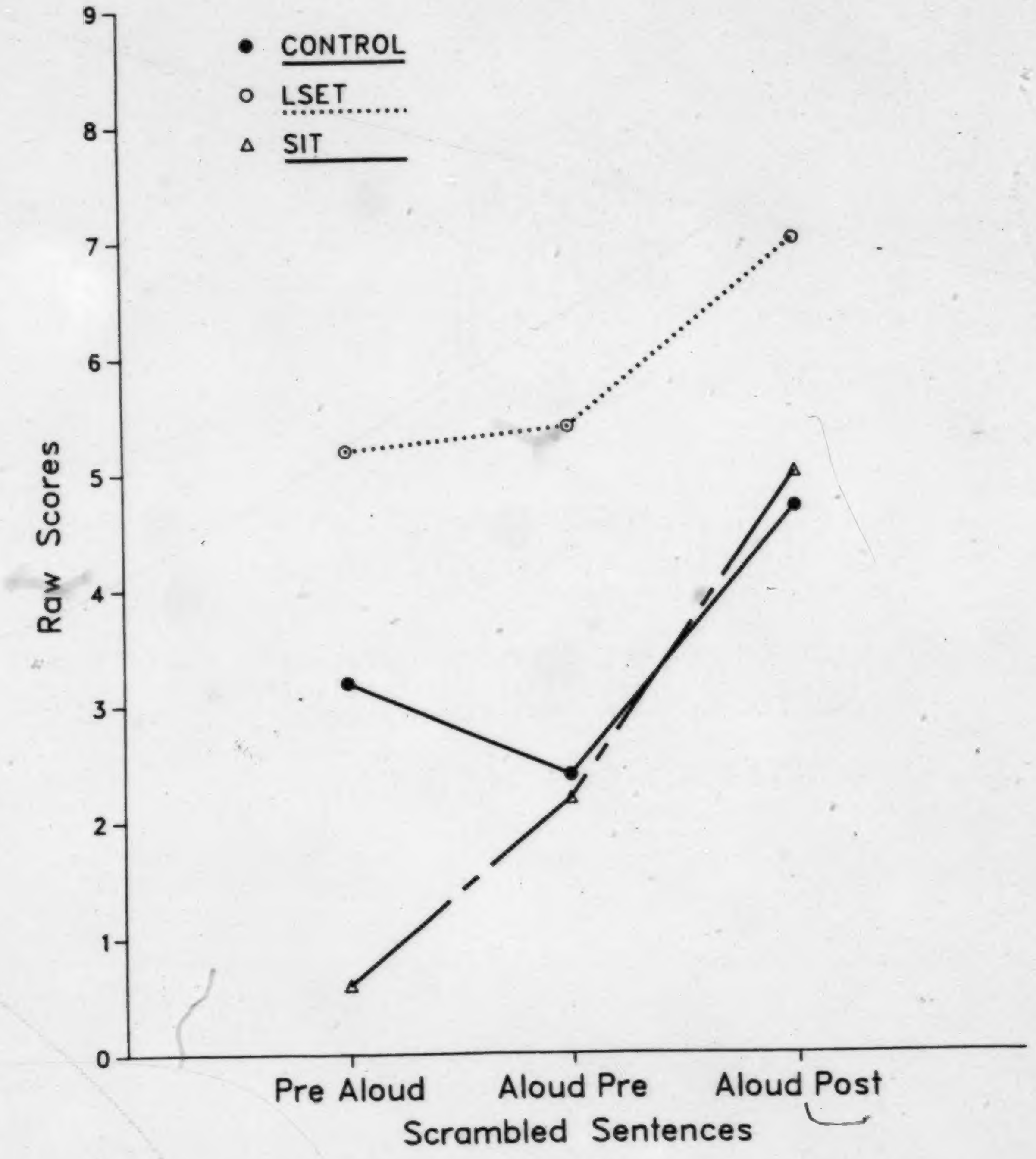
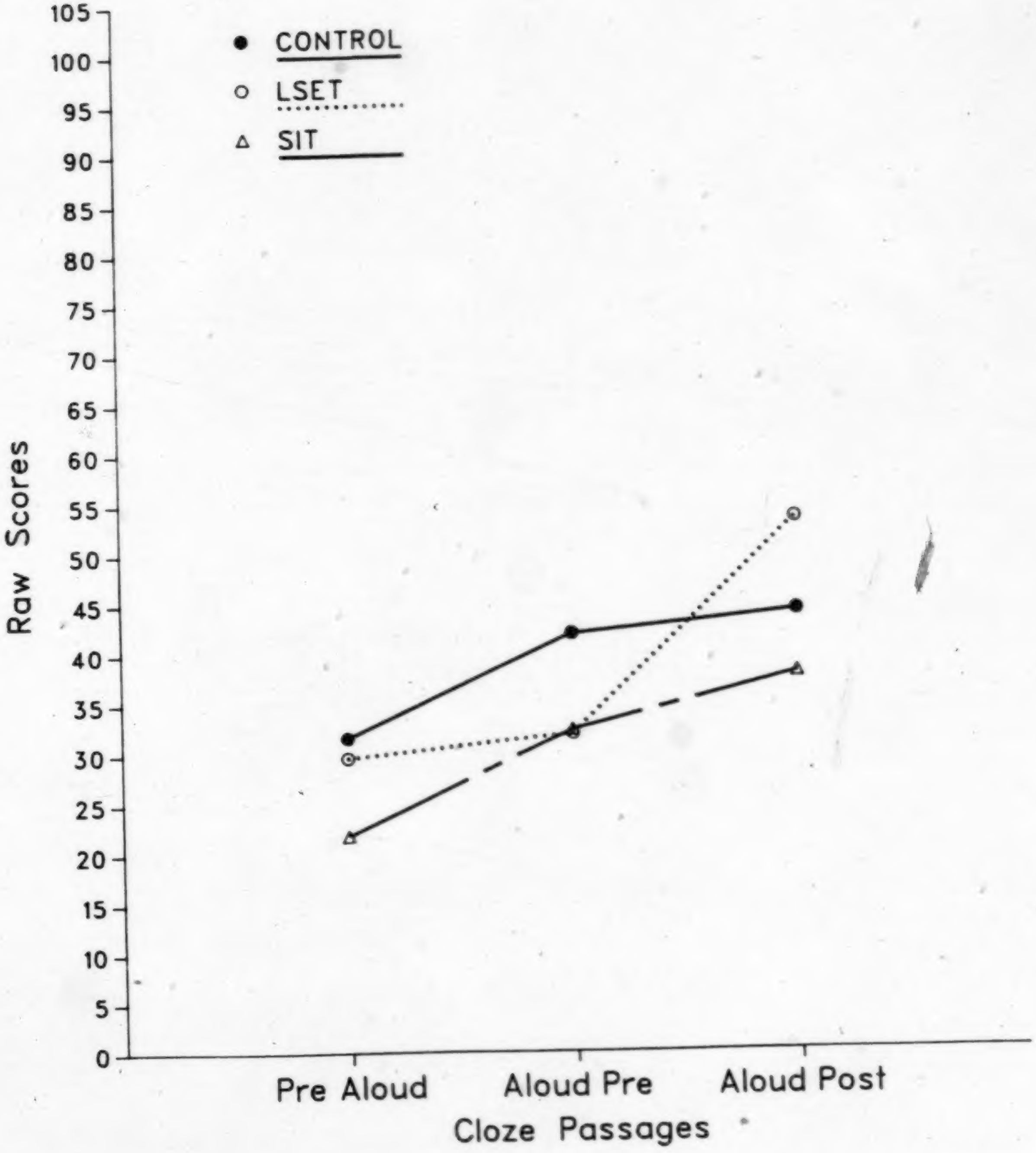


Fig.33. Performance of CONTROL, LSET and SIT Groups on Cloze Passages



As well, no clinically significant changes in strategy use by individual control students was recorded (see Tables VI, XVIII,X and XI).

As well, a review of Tables VI and XVI reveals no clinical or statistical significance for control students between aloud pre and aloud post intervention measures on the cloze passages, scrambled sentences, vocabulary or reading comprehension as measured by the Stanford. A review of Tables VI,XVIII,X, XVI, and XVII led to the conclusion that no statistically or major clinically significant changes took place for the control group.This is graphically presented in Figure 32 and 33.

With regard to the LSET group, some interesting positive trends emerged. The strategy training procedure focussed on asking questions, clarifying directions, rereading, scanning, looking back, reading ahead, grasping the main idea, noting the important parts, summarizing, checking, and expressing one's self clearly. In general students were taught to monitor their own behavior.

A review of Table VIII and XI indicated that students in the LSET group following a limited exposure to training made the following changes:

1. Four of the five students used the read ahead strategy versus one in the pre test (gain of 3).
2. Two students used the look back strategy versus zero in the pre test (gain of 2).
3. All five students used the main idea strategy versus

Table XVI
Analysis of Variance of Reading Comprehension Measure

Source	df	ms	f
Cloze			
Between subject			
Treatments	2	38.691	1.633
Subject with Group	12	23.701	
Within Subject			
Measure	1	2.695	0.518
Treatment X Measure	2	5.703	1.097
Measure X Subj. w Groups	12	5.200	

Table XVII
Analysis of Variance of Cloze Aloud and Scrambled Measures

Source	df	ms	f
Cloze			
Between subject			
Treatments	2	328.623	.503
Subject with Group	12	653.140	
Within Subject			
Measure	2	1132.354	21.010
Treatment X Measure	4	132.959	2.457
Measure X Subj. w Groups	24	53.897	
Scrambled			
Between subject			
Treatments	2	44.877	4.933
Subject with Group	11	9.097	
Within Subject			
Measure	2	19.204	7.280
Treatment X Measure	4	1.612	.611
Measure X Subj. w Groups	22	2.638	

four in the pre test (gain of 1).

4. Three of the five students attempted to verify hypotheses versus one in the pre test (gain of 2).
5. All five students used personal experience versus four in the pre test(gain of 1).
6. All five students attempted to monitor their behavior versus one in in the pre test (gain of 4).

In total, it was concluded that the LSET students appeared to benefitted from the brief intervention. As well, the use of the the intuitive strategies such as, "it makes sense", decreased in the post intervention assessment (Table VIII and XI). It was concluded that this may represent an attempt by the students to explain the reasons for selecting their answer.

With regard to individual students, all but Student Five and Student Four improved in their use of strategies. Students Four and Five were perceived by the instructors and raters to be weaker conceptually than their peers in the study.

The improved strategy use was also in evidence in the peer teaching video-tape. Two of the three students in the video-tape demonstrated transfer of their strategies to other students in a dynamic proactive leadership manner. Indeed, one of the students reported spontaneously generalizing the reading strategies to her math. This statement was verified by the ratings received from her math teacher. As well, instructor and rater reports affirmed these improvements.

These findings demonstrating a trend towards enhanced effective strategy use, increased performance in reading passages, and enhanced organizational and communication skills were consistent across instructor, rater and teacher perceptions, as well as based on quantifiable data. However, the effect was not statistically significant. A follow up study with a larger sample controling for the variance in pre test scores on the scrambled sentences and cloze passage should be conducted.

With regard to the SIT group, the strategy training focussed on the same strategies as in the LSET group. However, the instructional method was different choosing to focus on teacher-generated and directed strategy instruction as opposed to learner generated and directed strategy instruction. The effect was an interesting one as captured by comparing Tables 8 and 11. Specifically, the following changes resulted in students in the LSET group following instruction.

1. Four of the five students used the reading ahead strategy versus three in the pre test (gain of 1)
2. Four students used the main idea strategy versus one in the pre test (gain of 3)
3. Five more students used a questioning of another person strategy versus one in the pre test (gain of 4)
4. Three more students used personal experience versus one in the pre test (gain of 2)

5. Only two students used semantic cues as a strategy versus four in the pre test (a loss of 2)
6. Three students moonitored their behavior in post testing versus one in the pre test(gain of 2)

While these changes have to be placed in the perspective of a small sample, who were different in strategy use at the outset, and therefore had different oportunities for growth, attempts at monitioring versus other induced strategies such as questioning another person alerted the observer to an interesting finding. It was concluded that the SIT group may have become more "other" directed rather than "self" directed following the training. This hypothesis also was reached by the instructors who provided the training.

With regard to individual students, all but Student Seven appeared to have improved their performance in strategy use.

With regard to peer teaching, students in the SIT group did not provide a dynamic proactive teaching style. While some of this may be due to the nature of the student, it appears that an interesting trend for further study was found. That is, it appeared that students in the SIT group were less dynamic, verbal, proactive and self assured in their responses than were the LSET students. For example, in the peer teaching students in the SIT group sat away from the younger students, did not communiate and looked toward the cameraman for direction. Some transfer of rote strategies did take place to a limited extent in the peer teachering. Prompts by the interviewer were necessary to move the student along. Instructor, rater and interviewer reports confirmed this finding.

These findings demonstrated a trend towards gains in selected assessment measures without an associated strong gan in strategy use. As well, students in the SIT group tended to become more "other" directed following training.

In response to research question three, regard the impact of limited exposure to LSET, SIT and traditional instruction on strategy use, it was concluded that both LSET and SIT lead to enhanced strategy use in favour of LSET. As well, more students in the LSET group became self monitors, became more proactive and dynamic in their peer teaching, relied less on directions from other persons, and generally used more systematic planning, focussed attention and clarity in communication.

Research Question 4

a. **What was the locus of control of educable mentally handicapped adolescents?**
b. **Did limited exposure to the three intervention conditions (control, LSET and SIT) effect locus of control as perceived by EMH adolescents?**

A review of IAR scores (Table VII) demonstrated that on the average the educable mentally handicapped adolescents in the study accepted self responsibility for their academic success to the same extent as did their average IQ age peers. While a wide range of levels of acceptance of self responsibility for academic success was found in the educable mentally handicapped group, twelve of the students were around the average score. with three selecting extreme answers, one of whom accepted little self responsibility for academic success.

An examination of the total pre test (Tp') scores on the IAR (Table VII) indicated that the educable mentally handicapped students in the study accepted slightly less self responsibility for their overall academic achievement than did their average IQ age peers. Their range of 15-31 was slightly narrower than the range for their average IQ age peers (14-32).

An examination of the Rotter pre test scores (P') (Table XII) indicated that on the average the educable mentally handicapped students in the study tended not to accept self responsibility for general and academic outcomes. Averages for similar age groups of high intellectual functioning students ranged from a low of 5 to a high of 10, depending on the group and year of administration. Only four of the fifteen students in the present project would have been considered as accepting self responsibility for their general and academic outcomes. When compared to high intellectual functioning students who had completed the Rotter.

The tendency to non acceptance of self responsibility for general and academic outcomes is stronger than the tendency toward non acceptance of self responsiblity for academic achievement reported on the IAR. However, the direction of the tendency is the same. Changes may have arisen because of the multidimensionality of the Rotter Scale. As well, approximately the same number of students tended toward non acceptance of self responsibility on the Rotter (10) as on the IAR (9). However, the tendency toward acceptance of self responsibility shifted for four students with a change in instruments. This indicated that the instruments appear to measure different dimensions of self responsibility, a point confirmed by a non significant correlation between the total score on both scales. Difficulties interpreting both the Rotter and IAR were encounted due to the lack of a referent group compariable with students in the present study.

In response to research question 4a, regarding the locus of control held by mentally handicapped adolescents in this study, it was concluded that these students tended not to accept self responsibility for general world outcomes as measured by the Rotter nor for academic outcomes to the same extent as have their average IQ age peers, particularly as it pertained to accepting self responsibility for failure. However, these students tended to accept self responsibility for their academic successes to the same extent as their average IQ peers. These quantitative findings were supported by the observations and perceptions of the instructor and by the raters who listened to the audio tapes of the student/instructor interactions.

A 2 (measure) X 3 (treatment) anslysis of variance looked at the interaction involving pre and post measures of locus of control and the treatment conditions. Each measure of locus of control: Rotter and IAR, was analyized separately (Table XVIII). Results revealed that a significant differance (F 2, 11 = 9.928, p <.05) existed between the control group and the LSET group on pre and post total IAR scores. In addition, a one way analysis of variance (Table XIX) indicated that students in the LSET group noted significantly more positive statements (F 2,14 = 4.571, p <.05) in the post IAR measure than students in the control group. As well, the toatal IAR post measure score of the LSET group was significanty better (F2,14=5.807,p <.05) than the control groups total post score.

This was interpreted to mean that students in the LSET group came to accept greater self responsibility for their academic success contributing to greater self responsibility for academic achievement than did students in the control group who appeared to accept less responsibility for academic achievement in the post test (19.8) than in the pre test (23.6). No significant changes were observed in the SIT group.

In response to research question 4b regarding the impact of short term intervention on locus of control, it

Table XVIII
Analysis of Variance of Locus of Control Measures

Source	df	ms	f
Rotter			
Between subject			
Treatments	2	0.233	0.004
Subject with Group	12	55.167	
Within Subject			
Measure	1	0.533	0.200
Treatment X Measure	2	3.234	1.213
Measure X Subj. w Groups	12	2.667	
IART			
Between subject			
Treatments	2	63.700	2.496
Subject with Group	11	25.518	
Within Subject			
Measure	1	0.492	0.330
Treatment X Measure	2	14.800	9.928*
Measure X Subj. w Groups	11	1.491	

* p < .05

Table XIX
Analysis of Variance of Pre and Post Locus of Control Measures by Group

Source	df	ms	f
Between Groups			
Pre IAR (P)	2	3.467	.385
Pre IAR (N)	2	1.867	.437
Pre IAR (T)	2	7.800	.402
Post IAR (P)	2	27.428	4.571*
Post IAR (N)	2	10.203	2.809
Post IAR (T)	2	70.089	5.807*

*p < .05 between Control and LSET Groups.

(IAR = Intellectual Achievement Responsibility Questionnaire; P = Positive Statemtnes;

N = Negative Statements; T = Total)

was concluded that LSET may facilitate a shift towards greater acceptance of self responsibility for academic success than did a traditional approach. This shift toward greater acceptance of self responsiblity for success contributed to a shift towards greater overall responsibility for academic achievement. Limited use of SIT procedures did not appear to contribute to any change in student acceptance of self responsibility for academic achievement. This finding was supported by instructor and rater perceptions of the students. Indeed, instructors and raters perceived students in the control group to become less accepting of self responsibility for academic achievement between pre and post assessments.

Research Question 5

a. **What teacher perceptions of reading strategies in problem solving were held of educable mentally handicapped adolescents?**

b. **Did limited exposure to the three intervention conditions (control, LSET, SIT) affect teacher perceptions of reading strategies?**

In response to research question 5a, a review of math and language arts pre test ratings in Table VII demonstrated that teachers perceived the academic problem solving strategies involving reading by educable mentally handicapped to be lacking. Specifically, students were perceived as lacking a focus on directions, failing to clarify directions, failing to organize self prior to initiating action, failing to focus on relevant information, failing to use a systematic approach in their work, lacking spatial organizational skills, and failing to develop and verify hypotheses regarding a problem solution. Math teachers tended to perceive students somewhat more positively than language arts teachers with regard to the reading strategies used by students. Nevertheless, all teachers generally perceived most students in the study as using effective strategies less than fifty percent of the time.

While different teachers held slightly different perceptions of each student, only one student was seen by both teachers as tending to use the strategies listed on the rating scale for most of the time. Three other students tended toward using some of the strategies slightly more than fifty percent of the time. The remaining eleven students were perceived as using the strategies less than fifty percent of the time. Two students were perceived as never using the strategies according to their language arts teacher.

With regard to research question 5b, a two (raters) x three (treatments) analysis of variance involving pre and post ratings by math and language arts teachers for each of the three treatment conditions was carried out (Table XX). Interactions between ratings by math and language arts

Table XX
Analysis of Variance of Teacher Ratings

Source	df	ms	f
Math			
Between subject	2	94.033	1.338
Treatments	12	70.284	
Subject with Group			
Within Subject			
Ratings	1	154.141	9.870
Treatment X Ratings	2	41.230	2.640
Ratings X Subj. w Groups	12	15.617	
Language			
Between subject			
Treatments	2	82.432	0.883
Subject with Group	12	93.384	
Within Subject			
Ratings	1	580.801	18.487
Treatment X Ratings	2	120.098	3.823*
Ratings X Subj. w Groups	22	31.417	

* $p < .05$

teachers for each group were computed separately. Ratings on pre/post were not significantly different for math teachers between groups (control, LSET, SIT). However, gains between aloud pre and aloud post ratings by language arts teachers were significant ($F\ 2,12 = 3.823$, $p <.05$). This may have been due to the fact that the students were trained on reading strategies, not on math strategies. A one way analysis of variance (Table XXI) demonstrated that no significant differences existed between the three groups on pre and post math and language arts ratings by teachers.

A review of the raw score averages across math and language arts teachers as shown in in Table VI along with instructor and rater perceptions provided clinically significant insights to changes that took place within and between the groups. For example, no clinically significant changes were observed in the control group as indicated by instructors, raters or teacher perceptions. While the SIT group tended to be perceived by teachers, instructors and raters as using more reading strategies more often than the control group, no clinically significant changes were observed from the pre to post rating. However, the LSET group, were viewed by teachers as making gains following the intervention. This gain toward more systematic planning, clarity in communication and focussing of attention also was perceived by instructors and raters. The change from pre to post was more observable based on the perceptions of the language arts teachers than on the perceptions of the math

Table XXI
Analysis of Pre and Post
Teacher Rating Measures by Group

Variables	df	ms	F
Pre Math	14	747.60	1.628
Post Math	14	553.73	.259
Pre Lang.	13	825.00	1.366
Post Lang.	13	821.70	2.655

teachers

Therefore, in response to research question 5b regarding the impact of the interventions on teacher perceptions of strategy use by teachers, a clinically significant difference existed in favor of the LSET group over the control group. This clinically significant difference approached statistical significance. However, it is important to note that because the LSET group were clinically different in the pre measure (tending towards less use of strategies than the SIT or control group), these students had a greater opportunity to improve given the hypothesis of regression towards an average score.

V. DISCUSSION AND IMPLICATIONS

A. Existence of Strategies in Educable Mentally Handicapped Adolescents

The results of this exploratory study indicated that educable mentally handicapped adolescents functioning at the fourth to sixth grade level in reading do possess a variety of strategies to assist them in reading comprehension activities. A total of twenty-five strategies were found using a series of think aloud and retrospective assessment techniques. This finding contradicts the findings of Brown(1980), Dewart(1979), and Ashman(1984).

Dewart (1979) found that the mentally handicapped typically utilized semantic cues in their reading. The present study found a variety of strategies of which semantic cues was one of the lesser strategies used by eight of the students. Brown (1980) found that younger and more delayed students do not possess a variety of reading comprehension strategies. Also, Ashman (1984) in summarizing recent research on the mentally handicapped concluded that the mentally handicapped were characterized by an inability to spontaneously generate strategies, an inability to monitor those strategies, and possessed a limited awareness of their information processing. Of the fifteen students who participated in this research three were observed as monitoring both their reading and their application of a reading comprehension task. As well, all the students exhibited a range of strategies. However, it must be noted that the present study has used older mentally handicapped students. The use of older students may account for the differences in the results.

While some of the identified strategies were used in isolated cases by one or two of the students, several strategies were consistently displayed across students. As well, a high incidence of strategy use was observed. For example, attempts at forming interpretations was observed in thirteen of the students. The number of observations of this strategy in all students across all aloud pre assessments was 278. The per student incidence rate ranged form 4 to 43 with an average identification rate of 23. Another example was the observation that twelve students attempted to develop hypotheses regarding events in the passages they were asked to read. However, only one student attempted to verify one hypothesis.

Despite these present positive findings, it must be remembered that because a particular strategy was present, does not mean it was used effectively or efficiently. As was noted in the preceeding example, of the eleven students who generated an hypothesis regarding the material they were reading, only one student attempted to check the appropriateness of one hypothesis.

This led to the tentative conclusion that mentally handicapped adolescents have a variety of reading comprehension strategies within their repertoire. However the strategies may not be used effectively or appropriately. Further, the qualitative analysis revealed that many of the students did not know they were using a strategy, nor could they identify the strategy. While this may appear somewhat discouraging, a second part of the exploratory study found that the use of strategies was receptive to improvement with a short term intervention procedure. This will be discussed more fully in a later section.

The importance of finding a variety of strategies within the repertoire of educable mentally handicapped adolescents offers the prospect of more successful interventions. It would appear to be easier to build on existing strategies rather than having to begin by inducing the strategy. As well it appears that a number of the students attempted to process information in a conceptually driven process utilizing the main idea, personal experiences and hypothesis generation such as described by Rummelhart (1977). Given the strategy of generating an hypothesis, teaching the student to verify the nature of an hypothesis may be an easier task.

Because this was an intensive exploratory study on a limited number of students, it is important for future research to attempt to validate on a larger sample of students the finding that older mentally handicapped students do possess a variety of strategies.

The present study had as one of its primary purposes the review of four reading comprehension strategy identification assessments to determine which, if any, provided information on strategy use by educable mentally handicapped adolescents.

B. Effectiveness of Measurement Devices in Strategy Assessment: Implications for Methodology

The results of this exploratory study indicated that of four types of reading strategy assessment instruments, including idea units by Brown and Smiley (1977), introspection passages, scrambled sentences and cloze passages, the cloze passages gave the most comprehensive view of strategic behavior by the students. Indeed, it was concluded that future research may be able to rely on only the cloze passages and still obtain a rich variety of information on the use of reading strategies by educable mentally handicapped adolescents.

This is a significant finding for several reasons. First, as observed in the present study, educable mentally handicapped individuals tended to become frustrated with the present tasks, perhaps because of their lack of familiarity, or perhaps as a result of the demands placed on the students to stop, focus,think, and verbalize. Therefore, so as to reduce as much extraneous frustration as possible, it is important to reduce the number of assessments to which students are subjected. As well, in order to maximize the ecological validity of any study, assessment time should be reduced to an amount that is viable under normal classroom conditions.

Secondly, as noted by Terry and Pakes(1985), few studies on reading address the mentally handicapped, particularly the mentally handicapped adolescent. Therefore, assessments instruments typically are designed to assess younger students, average functioning older students or college students. Indeed, as stated by Terry and Pakes (1985), most strategy assessment studies have looked at average or better functioning students, college students and college professors. Implications of findings with college students and college professors have limited generalizability to the mentally handicapped. As a result, while methodologies may be similar, the instruments are often at too high a reading level or at a differet interest level. As indicated by Luftig and Johnson (1982) the Brown and Smiley idea unit passages consisted of Japanese folktales which may not be congruent with the life experiences and knowledge bases of the mentally handicapped. This aspect in particular was observed when the students in the present study were unable to cope with the idea unit passages as a result of the possible complexity of the task and the possible lack of familiarity with the content.

A third significance associated with the results of this exploratory study is the potential to directly examine strategies that are trained in cognitive education research. For example, recent research by Narrol et. al.(1983) and Samuels et. al. (1984) involving the training of generic problem solving strategies used global measures such as group IQ tests to detect changes in student performance. While changes resulting from generic problem solving interventions should be detectable in global measures over a long period of time, such changes are unlikely to be readily recorded given the short duration of present research. As well, measurement error associated with such group measures tends to limit confidence in the results. Therefore, during the initial stages of research the potential impact of cognitive intervention programs fails to be recognized, perhaps as a result of inappropriate measurement rather than ineffective intervention techniques. While the present instruments address reading, the potential to develop similar instruments in mathematics, social problem solving and other school and life-related curriculum becomes possible.

With regard to the four instruments under study, it was concluded that the cloze passages were most effective followed by introspective passages and scrambled sentences. Students in the present study could not complete the tasks in the idea units as developed by Brown and Smiley (1977), perhaps because of the content and/or the nature of directions Future research should address alternative content, presentation and directions associated with the passages. The cloze passages elicited a variety of strategies with sufficient incidence to ensure that the strategy was more than a chance happening. In the case of the introspection passages, a limited range of strategies such as restatement and interpretation emerged. The scrambled sentences elicited strategies at such a low incidence rate that some may have been due to chance. Use of the scrambled sentences alone may result in researchers and teachers not knowing whether a particular strategy existed.

Since this study was in part a methodological review, it is important to consider the significance of the findings regarding the assessment instruments in somewhat more detail.

With the exception of the idea units, all passages could be considered ecologically valid in that they were adapted from typical high interest low vocabulary readers. As well, as suggested by Bauman (1982) students had to read the passages as they would in a school setting.

While the idea unit passages were narrative and some of the scrambled sentence units may be considered narrative, the introspection passages and the cloze passages were expository. Expository material was utilized because typical secondary level classroom texts are expository (Bauman, 1982). It was hoped that by use of an expository passage, ecological validity would be greater and previous knowledge of story formats would be more limited, thereby avoiding the further confounding of results. Since narrative passages are more familiar and easier to understand, future research may want to compare and contrast expository and narrative passages with this population.

With regard to the use of introspective data, it was concluded on the basis of this study that while limitations exist, introspective data is possible with educable mentally handicapped adolescents. Further, a rich variety of insights into the functioning and strategic behaviors governing information processing in a reading activity by adolescent mentally handicapped adolescents is available to the researcher. For example, the educable mentally handicapped adolescents in the study were observed to have a variety of strategies within their repertoire. Further, it was found that some utilized monitoring strategies. Despite exhibiting a homogeneous relationship on reading comprehension, vocabulary and intelligence, the students formed a very heterogenous group on the use of strategies.

These are significant findings that tend to challenge some of the conceptualizations of the mentally handicapped supporting a position held by Hallahan and Kaufman (1976). Hallahan and Kaufman (1976) argued that the mentally handicapped like the learning disabled are not consistently low across all areas. The use of strategy assessment devices in the present study revealed a different pattern of strengths and weakness between and within students. Furthermore, the success of the verbal reports in the present study revealing insights into the functioning of the mentally handicapped adolescent pointed out that if conducted carefully insights into the reading strategy functioning of the mentally handicapped can be gained, despite their limited linguistic skills as reported by Brown (1977) and Luria (1961).

While the effectiveness of the supports suggested by Ericsson and Simon (1980), Garner and Alexander (1982) and Afflerback and Johnson (1984) were not evaluated, it was concluded that the use of these supports appeared useful. Examples included nonspecific and noncueing probing, the simultaneous collection of observational and quantifiable test data, and the reduction of memory confounds by reducing the interval between a student response and retrospective questioning. As well, this study utilized procedures to train students to think aloud on a non related task as suggested by Schrieiner (1979) and subsequently confirmed by Afflerback and Johnson (1984).

Documenting of this process should contribute to future research since, as Ericsson and Simon (1984) have stated, verbal data gathering and data analysis procedures vary tremendously with sketchily reported methods appearing in research publications. As noted by Chang (1983) verbal reports as data do lack universal acceptance. Perhaps the systematizing of these procedures as begun in this research will aid a more universal acceptance. As well, a further outcome of the present research may assist in the training of other personnel in the gathering of verbal report data. These procedures should be subjected to further refinement.

The concern that Afflerback and Johnson (1984) observed relative to the effect that think aloud procedures have on task completion was observed in the present study. The scrambled sentences task and the cloze passages first were completed by the students without think aloud. It was concluded that in some cases the think aloud procedure assisted student performance, perhaps because the think aloud procedure led to an increased focussing on the part of the student. In other cases the think aloud procedure did not influence task completion, or occurred with a decrease in achievement. Since no other event was observed to interfere with task completion, it was assumed to be an effect of think aloud. While Lupart (1984) found no effect of think aloud with college students, this aspect should be evaluated further with the mentally handicapped.

It remains for future research to standardize the use of the cloze passages, scrambled sentences and introspective passages to ensure their validity and consistency. As well, future research should address standardizing introspective and retrospective procedures associated with the use of these instruments. In particular, use of the cloze passages should be subject to further research given the variety of strategies elicited through their use. As well, the aloud cloze passages correlated .58 with a traditional standardized reading comprehension test indicating that the passages tapped some of the reading comprehension measured in the group test, but provided a somewhat different insight into the reader. The nature of this insight should be the subject of further research.

C. Perception by Teachers of Strategy Use in Educable Mentally Handicapped Adolescents

The results indicated that most educable mentally handicapped adolescents were perceived to lack strategic behavior in reading activities associated with their academic classroom activities. Generally, teachers perceived students to lack clarity in expression, failing to focus their attention, plan tasks systematically and failing to clarify directions associated with a task. This perception would tend to confirm the statements of Ashman (1984) and Brown(1980) who argued that mentally handicapped do not spontaneously generate strategies.

While the present methodology of introspection and think aloud may have led to a focusing of attention by students, it was concluded that the rating scale provided to teachers to gain their preceptions of student problem solving behavior was too generic to tap the strategies assessed by the think aloud passages in the study. In other words, the teacher rating instrument may have tapped more generic problem solving behaviors than did the reading assessment instruments. Nevertheless, it had been expected that reading strategies would be detected by the teachers. However, given that teachers at the school did not address reading instruction per se, the existence and impact of these strategies may have gone unnoticed. Once again, the finding that teachers did not perceive the students to have many strategies, while confirming the statements of researchers such as Brown (1980), also pointed to the fact that the methodology to assess the awareness of those strategies does not appear to exist.

D. Locus of Control for Educable Mentally Handicapped Adolescents

The results of this study provided a rather surprising finding with regard to self acceptance of responsibility for achievement. On the average, educable mentally handicapped adolescents accepted self responsibility for their academic achievement in the same manner as did their normal achieving age peers according to reports of self acceptance of academic achievement. This was surprising in that it was expected that greater non acceptance of self responsibility contributing to a perceived external locus of control would be found.

Such an expectation was fostered through statements by Harris (1982) who held that lower achieving individuals tend towards an external locus of control. Some insight into this difference may be gained from the fact that scores on the Rotter indicated that educable mentally handicapped adolescents did express less acceptance of self responsibility for more general world events than their age peers. In other words, educable mentally handicapped adolescents may accept self responsibility for academic achievement but not for more global outcomes. Nevertheless, the tentative conclusion was reached that educable mentally handicapped adolescents accepted self responsibility for their academic achievement. This conclusion probably has more merit than first occurs to the reader. A growing body of research summarized by Weins (1983) described the passive nature of students with learning problems. If, as the findings of this study indicated, mentally handicapped adolescents accept self responsibility for their academic achievement if not for general world outcomes, think of the frustration experienced through repeated failures which are perceived to be within your control. Is it any wonder that mentally handicapped adolescents tend to avoid active confrontation of their reading materials as found by Markman (1977)? The implications of this finding tends to confirm the philosophy of Feuerstein (1980) and others who ascribe to the importance of providing disabled learners with a motivation to learn and to instill a proactive interaction with the material to be learned.

E. Impact of Strategy Training Interventions

While the primary purposes of this study were to determine the nature of strategies used by educable mentally handicapped adolescents in a reading comprehension task, and to determine which of four instruments best provided that information, a secondary purpose was to examine the potential impact two cognitive intervention procedures might have on existing strategies following a very short term intervention. Indeed, it might be argued that the intervention was more a testing of procedures rather than a real attempt to induce change.

Despite the brevity of the intervention, the results indicated that the Learner Strategies model did have some impact on existing student strategies and this impact was sufficient to be preceived by teachers at the school. As well, the Self Instructional Training procedure was perceived to have an impact, although not as observable as the Learner Strategies model. No information on maintenance or generalization was gathered. This should be the subject of a future study.

Specifically, the results indicated that students who were in the Learner Strategies group did significantly better on the cloze passages than did their cohorts in the study. Students in the Learner Strategies group became more accepting of self responsibility for academic achievement, particularly self responsibility for academic success. As well, students in the Learner Strategies group were perceived to use more strategic planning by their language arts teachers.

While these quantifiable results offered support for the conclusion that the Learner Strategies group showed significant improvement across achievement on cloze passages, teacher perceptions, and acceptance of self responsibility for academic achievement; it should be noted that the statistical procedures may be questionable due to the small sample size and the extreme range of scores found among the students on the pre test measures. As well, the teacher rating scale has not been validated. However, the same teachers completed the pre and post test measure on the same student. Therefore, within individual students some confidence can be expressed in the results. However, despite providing explanations to teachers at least one teacher expressed difficulty completing the ratings and several teachers completed the scale only following repeated requests by the administration. This was due to the pressure of year-end activities rather than an inherent concern for the scale or the research.

Conscious of these cautions, confidence in the results associated with the cloze passages and the student's acceptance of self responsibility for academic achievement was felt to be appropriate. This was particularly the case when the qualitative data was reviewed. More strategies were generated by more of the students in the Learner Strategies group than in the Self Instructional group or the Control group. Indeed, the Control group showed very little change between the pre and post test measures. In fact, some decrease in performance may have taken place in the Control group between pre and post test measures. As well, the Learner Strategies group were observed to utilize self monitoring with less reliance on external agents whereas little change was observed in the Self Instructional group. Indeed, a tendency toward reliance on the instructor following intervention was observed in the Self

Instructional group.

Within the limitations of the present study, it was concluded that the focus on the "Learner" being responsible for self organization and use of strategies, through the directed efforts of the instructor using a Socratic dialogue, fostered improved performance in measures of reading and self acceptance for academic achievement. This improved performance was observable by teachers. Given that the teacher rating scale addressed more generic problem solving organizational skills than included in the intervention package, this finding is of particular significance. Future research should address the impact of this intervention over longer periods of time as well as with a larger sample of students.

While this finding may be an artifact of a short term dynamic aproach which highly motivated the students because of its uniqueness, the same could be said of the Self Instructional intervention, which also was unique to the students. However, SIT was more of an imposed strategy than the Learner Strategies intervention which is more of a co-operative teacher/student intervention.

It is important to note the level of frustration observed in several students in the present study, either as the result of the assessment or as the result of the intervention. Further research should be conducted to determine the optimal instructional time for such assessments and interventions. As well, an expanded study should address more precisely the nature of perceived improvements as well as the acquisition, maintenance and generalization properties of these interventions with educable mentally handicapped adolescents. Also, it may be useful to attempt an exploratory study with younger students to determine their response to the intervention and assessment processes.

Within the limitations of the study, findings in support of the Learner Strategies model, particularly its emphasis on active learner involvement offer a significant contribution to the field. The indication of positive results from such a short term intervention strengthen the findings of other researchers such as Collins (1977) and Anderson (1977). As well, both Brown (1978) and Meichenbaum (1979) have advocated the use of a Socratic type dialogue with students. However, a specific training program avoiding the imposition of teacher generated strategies did not appear to have been developed or implemented. This study has particular significance in that it addressed the needs of the educable mentally handicapped. It has been assumed for some time that the mentally handicapped could not utilize inner speech nor would highly verbal training regimes benefit such students (Costa, 1983; Nichol et. al. 1982). Given the apparent success in the Learner Strategies group in the present research, the prognosis for further attempts at higher level instructional programs for the educable mentally handicapped is positive and should be undertaken.

F. Future Research

A number of issues emerged during this study which require further examination.

One issue for future research is to validate on a larger sample the existance of a range of spontaneously generated strategies within both older and younger mentally handicapped students. As well, future research should attempt to discern the effectiveness and the effective application of these strategies by the mentally handicapped. The distinction as to effectiveness is raised to alert future researchers to attempt to priorize in order of effectiveness the strategies used by the mentally handicapped. That is, it may be that some strategies such as "restatement" are less powerful and useful when compared with "hypothesis verification".

A second issue requiring further study concerns the nature of passage content and the task directions associated with the assessment devices. Specifically, further research should be conducted to determine the impact of familiar versus non familiar content, and the impact of differing types of directions. This is particularly true for the Brown and Smiley (1977) idea units.

Future research also should address the need to develop information processing strategy assessment tools in the areas of mathematics and social problem solving.

A fourth issue for future research may be the exploration of the impact expository versus narrative stories have on strategy generation by mentally handicapped adolescents. Associated with this issue is the notion that use of a title may aid students in organizing material to be read, thereby reducing the apparent frustration experienced by students with the tasks in the present study.

One of the more crucial areas for future research to consider involves the further documentation and verification of the methodological supports necessary to ensure the effective use of verbal reports as data. The present study utilized but did not evaluate the effectiveness of non specific probing, the simultaneous collection of observational and quantifiable test data and the reduction of memory confounds through the reduction of the time interval between student response and retrospective questioning, to itemize a few. Future research should evaluate the effectiveness of these and other techniques, as well as the effectiveness of training for research assistants in the gathering of such data. Further, the impact of think aloud procedures on non skilled readers should be examined more closely. Findings that think aloud did not influence skilled readers, such as in the Lupart (1984) study, were not confirmed with the mentally handicapped in this study. Rather, the introduction of the think aloud procedure appeared to aid some while appearing to inhibit others. Thus, the impact of think aloud procedures on non skilled readers should be evaluated further.

Future research also should validate the nature of the relationship of the cloze, introspection, scrambled sentences and idea unit passages to reading.

With regard to the intervention techniques, future research should examine the impact of the Learner Strategies model and the Self Instructional model on larger samples and for longer periods. In addition to the acquisition of these strategy training programs, maintenance and generalization factors should be examined as well as the exact nature of changes in both cognitive and affective domains.

Because some students in the present study appeared to be frustrated by the assessment process and/or the instructional process, it is important for future research to determine the nature of the interaction, if any, between assessment and intervention. As well, future research should address optimal assessment and intervention times.

As a result of being overlooked in most research, these suggestions for future study address the mentally handicapped adolescent. However, the significance of working in a developmental manner with younger students should not be ignored. Also, it is suggested that the impact of these assessment and instructional procedures be examined with normal functioning students, as well as with other types of exceptional students including the learning disabled and gifted.

By way of a conclusion, this exploratory study offered a number of insights into strategy use by mentally handicapped adolescents, a "ways and means" to access those strategies, and the potential impact of cognitive instructional procedures on existing strategies. Future research in these areas is required to expand the knowledge base in the pursuit of more effective teaching.

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APPENDIX A

Teacher Rating of Student Approach to Classroom Academic Problem Situations

APPENDIX A

Teacher Rating of Student Approach to Classroom Academic Problem Situations

Student Name:____________________ Date:_______________
Teacher Name:____________________

Please circle the number that most closely approximates the pupil's typical type of responding to class work.

1 = Always
2 = Nearly Every Time
3 = About 50/50
4 = Once in a While
5 = Never

1. Responses to questions and/or directions and/or directions indicate reflection prior to action	1	2	3	4	5
2. A period of organization preceeds the initiation of academic tasks	1	2	3	4	5
3. Relevant pieces of information on an assigned task are selected from irrelevant pieces of information	1	2	3	4	5
4. Attention is focussed when directions are being given	1	2	3	4	5
5. Assigned tasks are checked to ensure directions are understood	1	2	3	4	5
6. A systematic approach is utilized in undertaking assigned tasks	1	2	3	4	5
7. Precise language is utilized in describing work and/or questions	1	2	3	4	5
8. Hypotheses are developed and tested when working on a problem	1	2	3	4	5
9. Spatial organization skills are utilized where necessary	1	2	3	4	5
10. Needed details are provided in student descriptions	1	2	3	4	5

APPENDIX B
Pre Think Aloud Measures
Cloze, Idea Units, Scrambled Sentences

APPENDIX B

Pre Think Aloud Measures

Name:____________________ Date:____________________

Cloze Pre Think Aloud
Story I
33 blanks, 307 words
9.3/1 ratio, 5.5 approx.reading level (Fry)

ANNA MARY ROBERTSON WAS ___1___ IN 1980. SHE WAS ONE OF TEN ___2___ IN A FARM FAMILY IN THE STATE OF NEW YORK. AT 12, SHE ___3___ HOME TO EARN HER LIVING AS A HIRED GIRL, ___4___ THREE MEALS A DAY. WHEN SHE WAS 27 SHE ___5___ THOMAS MOSES AND MOVED SOUTH TO ___6___ ON A FARM. THOMAS AND ANNA MARY MOSES HAD TEN CHILDREN, BUT ONLY FIVE ___7___. LIFE WAS ___8___, BUT ANNA MARY ACCEPTED THE HARDSHIPS. SHE HAD A BUSY LIFE.

AT 78, ANNA MARY MOSES BEGAN ___9___. SHE HAD NEVER TAKEN A PAINTING LESSON IN HER ___10___. IN FACT, SHE HAD NEVER SPENT MORE THAN A FEW ___11___ IN ANY KIND OF SCHOOL. HER ___12___ LIFE HAD BEEN SPENT ON ___13___. YET TEN YEARS LATER SHE WAS ONE OF THE BEST-KNOWN ___14___ IN THE WORLD.

ANNA MARY FOUND PAINTING EASY. AT FIRST SHE ___15___ HOUSE PAINT. SHE ___16___ ON CANVAS THAT HAD BEEN LEFT OVER FROM MAKING ___17___ FOR FARM MACHINES. SHE THOUGHT SHE MIGHT BE ABLE TO ___18___ A FEW DOLLARS FROM HER PAINTINGS. SHE SET FOUR OF THEM UP IN A DRUGSTORE IN HOOSICK FALLS. A MR. LOUIS CALDOR, WHO WAS AN ___19___ COLLECTOR, CAME INTO THE DRUG STORE AND ___20___ ALL FOUR OF THE PAINTINGS.

WITHIN A YEAR, DR. OTTO KALLIR BECAME ____21____ IN THE WORK OF THIS FARM WOMAN. DR. KALLIR ____22____ AN ART ____23____ IN NEW YORK CITY. HE DECIDED TO ____24____ HER PICTURES IN HIS GALLERY.

ON OCTOBER 9, 1940, THE ART SHOW OPENED. A NEWSPAPER REPORTER ____25____ ABOUT THE SHOW. IN HIS ____26____ HE ____27____ THE ARTIST A NICKNAME. HE ____28____ HER "GRANDMA MOSES". OTHER ____29____ AND MAGAZINES PICKED UP THE NAME. IN FACT, MILLIONS OF PERSONS NEVER ____20____ THE ARTIST BY ANY OTHER NAME. "GRANDMA MOSES" EVEN CAME TO ____31____ THE NAME HERSELF. AND HER ____32____, AT THE AGE OF 101, WAS FRONT-PAGE ____33____

WORD LIST

Story I

1. BORN
2. CHILDREN
3. LEFT
4. COOKING
5. MARRIED
6. LIVE
7. LIVE
8. HARD
9. PAINTING
10. LIFE
11. YEARS
12. WHOLE
13. FARMS
14. ARTISTS (PAINTERS)
15. USED
16. PAINTED
17. COVERS
18. EARN
19. ART
20. BOUGHT
21. INTERESTED
22. OWNED
23. GALLERY
24. SHOW
25. WROTE
26. Story
27. GAVE
28. CALLED
29. NEWSPAPERS
30. KNEW
31. USE
32. DEATH
33. NEWS

Name:____________________ Date:____________________

Cloze Pre Think Aloud
Story II
33 blanks, 298 words
9.0/1 ratio, 5.0 approx.reading level (Fry)

MONARCH BUTTERFLIES HAVE SHORT LIVES. NO MONARCH ____1____ LONG ENOUGH TO GO SOUTH TWICE. YET WITHOUT A LEADER WHO HAS MADE THE TRIP ____2____, MONARCHS FIND THEIR WAY TO THEIR WINTER ____3____.

UNTIL A FEW YEARS ____4____, NO ONE ____5____ THAT THE ____6____ DOES MAKE THE LONG TRIP SOUTH. EACH SPRING, PEOPLE IN THE ____7____ STATES AND CANADA SAW A FEW TATTERED, FADED ____8____ ABOUT. THEY THOUGHT THE BUTTERFLIES HAD ____9____ THROUGH THE WINTER, AS BEARS OR WOODCHUCKS DO. BUT A CANADIAN SCIENTIST, DR. FRED URQUHART, QUESTIONED THIS ____10____.

AS A BOY, DR. URQUHART HAD ____11____ FOR MONARCHS IN THE WINTER WOODS. HE HAD ____12____ OVER STONES AND LOGS, SEARCHED UNDER BARK AND ____13____ TREES TO LOOK INTO HOLES, YET NO ____14____.

DR. URQUHART DECIDED TO FIND OUT WHAT HAPPENED TO THE BUTTERFLIES IN THE ____15____. ALL THROUGH SCHOOL AND COLLEGE AND AT WORK IN A MUSEUM, HE STUDIED THEM.

HE TRIED KEEPING SOME MONARCHS AT VERY LOW ____16____. HIS TESTS PROVED THAT THEY CANNOT ____17____ WHEN IT STAYS BELOW FREEZING FOR SEVERAL DAYS. THEN HE KNEW THAT THE ____18____ HAD TO MIGRATE IN THE WINTER.

TO FIND OUT ______19______ THEY WENT, DR. URQUHART BEGAN TO TAG THEM. BUT THE LITTLE PAPER LABELS HE GLUED TO THEIR WINGS FELL ______20______ OR KEPT THE BUTTERFLIES FROM ______21______. DR. URQUHART FIGURED OUT HOW TO ______22______ A THIN LABEL OVER THE FRONT EDGE OF A MONARCH'S ______23______, CLOSE TO ITS BODY. WITH THIS LABEL, THE BUTTERFLY COULD STILL FLY ______24______.

ON THE ______25______ WAS A NUMBER THAT SHOWED WHERE AND WHEN THE ______26______ WAS TAGGED. THE LABEL ALSO TOLD WHERE TO ______27______ WHEN THE BUTTERFLY WAS FOUND.

ABOUT 5,000 ______28______ HAVE BEEN TAGGED. OF COURSE, ONLY A FEW OF THOSE ______29______ ARE FOUND AGAIN. BUT ENOUGH HAVE BEEN ______30______ TO SOLVE THE PUZZLE OF THE MONARCH'S MYSTERIOUS ______31______. WE KNOW ONLY MONARCHS ______32______ IN THE LATE SUMMER HAVE TIME TO FLY ______33______.

WORD LIST

Story II

1. LIVES
2. BEFORE
3. HOME
4. AGO
5. KNEW
6. MONARCH
7. UNITED
8. MONARCHS
9. STAYED
10. FAST (THOUGHT)
11. SEARCHED
12. TURNED
13. FALLEN
14. MONARCHS
15. WINTER
16. TEMPERATURE
17. LIVE
18. MONARCHS
19. WHERE
20. OFF
21. FLYING
22. PLACE
23. WING
24. SOUTH (WELL)
25. LABEL
26. MONARCH
27. REPORT
28. MONARCHS
29. TAGGED
30. FOUND
31. LIFE
32. BORN
33. SOUTH

Name:____________________ Date:____________________

Cloze Pre Think Aloud
Story IV
37 blanks, 352 words
9.5/1 ratio,
5.1 approx.reading level (Fry)

ON FEBRUARY 20, 1962, JOHN GLENN ORBITED THE ____1____. THREE TIMES IN THE SPACE CAPSULE "FRIENDSHIP 7". THE JETS FOR ____2____ HIS CAPSULE IN POSITION WERE SUPPOSED TO WORK BY THEMSELVES. BUT, DURING HIS FIRST ORBIT, SOMETHING ____3____ WRONG. ONE ____4____ DID NOT WORK RIGHT. COL. GLENN HAD TO ____5____ OVER THE CONTROLS. THE REST OF THE ____6____, HE HAD TO "FLY" THE ____7____ BY HAND.

ON THE SECOND ____8____, OTHER JETS WENT WRONG. THE ____9____ STARTED TO ROLL. BUT AGAIN HE WAS ____10____ TO CONTROL THE SHIP BY ____11____.

THEN HE FACED AN EVEN ____12____ DANGER. THE HEAT SHIELD HAD COME LOOSE.

A CAPSULE RUSHING ____13____ INTO THE EARTH'S ____14____ BECOMES RED HOT. TO PROTECT COL. GLENN, FRIENDSHIP 7 HAD A ____15____ SHIELD MADE OF FIBREGLASS. WITHOUT IT COL. GLENN WOULD ____16____ IN A FLASH OF FLAME AS HE ____17____ TO EARTH.

TO END ITS ____18____, THE CAPSULE MUST FIRE RETRO-ROCKETS. THE PLAN HAD BEEN TO SEPARATE THE CAPSULE FROM THE ROCKETS AFTER THEY HAD BEEN ____19____. THE MEN AT THE CAPE NOW CHANGED THAT ____20____ SO THAT THE

ROCKETS WOULD ____21____ BE DROPPED. THE THREE THIN BANDS OF METAL THAT ____22____ THEM TO THE CAPSULE MIGHT HELP HOLD THE HEAT SHIELD IN ____23____

JOHN GLENN TOOK THE ____24____ WITH HIS USUAL CALMNESS. USING HAND CONTROLS, HE MADE ____25____ TO FIT THE NEW PLAN.

AT LAST IT WAS TIME TO COME ____26____. HE BRACED HIMSELF. THE RETRO-ROCKETS FIRED ONE BY ____27____, SHAKING HIS CAPSULE. THEN, AS THE CAPSULE ____28____ THE EARTH, HE FELT AGAIN THE STRONG ____29____ OF GRAVITY.

THROUGH THE ____30____, HE SAW A FIERY GLOW. HE ____31____ THAT THE HEAT-SHIELD END OF THE CAPSULE WAS BREAKING UP. BIG FLAMING CHUNKS ____32____ PAST HIS WINDOW.

"I COULD SEE THE ____33____ AND THE GLOW," HE SAID LATER.

BECAUSE OF CONDITIONS CAUSED BY THE HEAT OF RE-ENTRY, MEN ON THE GROUND COULD NOT ____34____ COL. GLENN'S RADIO REPORTS. THIS ____35____ OF CONTACT WAS EXPECTED. BUT FOR MORE THAN SEVEN MINUTES THE WHOLE WORLD ____36____ IN FEAR.

THEN CAME JOHN GLENN'S ____37____. "BOY!" HE CRIED. "THAT WAS A REAL FIREBALL!"

WORD LIST

Story IV

1. EARTH
2. KEEPING
3. WENT
4. JET
5. TAKE
6. FLIGHT
7. CAPSULE
8. ORBIT
9. CAPSULE
10. ABLE
11. HAND
12. GREATER
13. BACK
14. AIR (ATMOSPHERE)
15. HEAT
16. DIE
17. RETURNED
18. ORBIT
19. FIRED
20. PLAN
21. NOT
22. HELD
23. PLACE
24. NEWS
25. CHANGES
26. DOWN
27. ONE
28. NEARED
29. PULL
30. WINDOW
31. THOUGHT
32. FLEW
33. FIRE
34. HEAR
35. LOSS
36. WAITED
37. VOICE

Name:____________________ Date:____________________

Idea Unit Passage I
Brown and Smiley (1977)

Ranking

1 1. Once there lived a chief

2 2. who had three sons.

3. They all were fine, strong young men

4. and very bright too.

3 5. But often their father wondered which of the lads was the most clever.

6. One day his advisors gathered for a meeting.

7. The chief looked around at the group of wise men

8. and asked them to help decide who was the most clever of his three sons.

9. "Come over to this oak tree,"

10. he said to his advisors,

11. "and let my three sons be brought here immediately."

12. After a few moments

13. the three young men appeared,

14. each leading a horse.

15. "My sons," said the chief,

4 16. "I want each of you to mount your horse

5 17. and show your skill to all of my advisors.

18. You may do what you please,

19. but when you reach this oak tree,

20. you must perform a trick

21. to show us how strong and clever you are."
22. The three sons mounted their horses,
23. rode to the edge of a long path
24. leading to the oak tree
25. and prepared to show their strength.
26. Galloping furiously,
6 27. the first son made straight for the oak tree.
28. He swerved neither to the right or left.
29. Holding his spear high,
30. he plunged it into the trunk with such force
31. that it mad a great hole.
32. Then to everyone's surprise,
33. the first son followed the spear
7 34. and leaped through the hole,
35. horse and all,
36. making a perfect landing
37. on the other side.
38. Those who were watching shouted their approval
39. with loud hearty cheers.
40. "Surely," they said,
41. "no one could do better than that."
8 42. Then the second son came galloping straight at the tree,
43. carrying no sword.
44. The people were afraid he might crash against the tree.
45. But suddenly

9 46. his horse rose in the air like an arrow
47. and sailed right over the oak tree.
48. The rider and horse landed unharmed
49. on the other side.
50. The crowd laughed with pleasure and surprise.
51. "Surely the third son will not be able to
do better than this,"
52. they said to each other
53. and held their breath.
10 54. The youngest son came riding toward the tree.
55. As he reached it,
56. he seized its branches in both hands,
57. dug his heels into his horse
11 58. and pulled the whole tree from the ground,
59. roots and all.
60. Then he rode up to his father,
61. waving the tree and smiling.
12 62. The crowd roared their applause for the
most clever son.

Name:____________________ Date:____________________

Idea Unit Passage II
Brown and Smiley (1977)

Ranking	
1	1. A father and his son
2	2. were taking their donkey into town to sell him
	3. at the marketplace.
	4. They had not gone a great distance,
3	5. when they met a group of pretty maidens
	6. who were returning from the town.
	7. The young girls were talking and laughing
	8. when one of them cried out, "Look there.
4	9. Did you ever see such fools,
5	10. to be walking along side the donkey when they might be riding it?"
	11. The father, when he heard this,
	12. told his son to get up on the donkey,
	13. and he continued to stroll along merrily.
	14. They traveled a little further down the road,
6	15. and soon came upon a group of old men talking.
	16. "There," said one of them,
	17. "that proves what I was saying.
	18. What respect is shown to old age in these days?
7	19. Do you see that idle young boy riding the donkey,
	20. while his father has to walk?

21. You should get down
22. and let your father ride!"
23. Upon this the son got down
from the donkey
24. and the father took his place.
25. They had not gone far
26. when they happened upon a group of women
and children
27. "Why, you lazy old fellow,
28. you should be ashamed,"
29. cried several women at once.
30. "How can you ride upon the beast,
31. when that poor little boy can hardly keep
up with you?"
32. So the good-natured father hoisted his
son up behind him.
33. By now they had almost reached the town.
8 34. "Tell me friend," said a townsman,
35. "is that donkey your own?"
36. "Why yes," said the father.
37. "I would not have thought so," said the other,
38. "by the way you overwork him.
39. Why, you two are strong
9 40. and are better able to carry the poor
beast than he is to carry you."
41. "Anything to please you sir," said the father,
42. "we can only try."

43. So he and his son got down from the donkey
44. and, taking a pole,
45. tried to carry him on their shoulders
46. over a bridge
47. that led to the marketplace.
48. This was such an odd sight that crowds of
people gathered around to see it,
49. and to laugh at it.
10 50. The donkey, not liking to be tied,
51. kicked so ferociously
52. that he broke the rope,
53. tumbled off the pole into the water,
54. and scrambled away into the thicket.
55. With this,
56. the father and his son hung down
their heads
57. and made their way home again,
11 58. having learned that by trying to
please everybody,
12 59. they had pleased nobody,
60. and lost the donkey too.

Name:____________________ Date:____________________

Scrambled Pre Think Aloud
Story I - 3 Units

A2 MANY PEOPLE LIKE TO COLLECT STAMPS AS A HOBBY.

B3 ONCE COLLECTED, THESE STAMPS CAN BE KEPT IN SPECIAL ALBUMS.

C1 SOME OF THESE STAMPS BECOME VERY VALUABLE AFTER THEY HAVE BEEN HELD IN A COLLECTION FOR A LONG TIME.

Story II - 3 Units

A3 THE SUN WAS JUST RISING AS THE PILOT LEFT HIS PLANE AFTER AN ALL NIGHT FLIGHT.

B1 THE TIRED PILOT APPROACHED THE BUNKHOUSE AS THE RISING SUN BOUNCED OFF THE WINDOWS.

C2 QUICKLY THE PILOT ENTERED THE HOUSE AND FELL ASLEEP.

Story III - 3 Units

A1 MANY AIRLINES FLY ANIMALS TO NEW HOMES CALLED ZOOS.

B3 THESE AIRLINES HAVE MEN CALLED CARETAKERS WHO ARE TRAINED TO TAKE CARE OF THE ANIMALS.

C2 THE CARETAKERS UNDERSTAND THE ANIMALS AND MAKE SURE THEY HAVE A GOOD TRIP TO THEIR NEW HOME.

Scrambled Pre Think Aloud
Story I - 5 Units

A3 JOHN BROWN AND HIS FRIEND DAN WERE CAVE HUNTING.

B5 THEY FELT A COLD DRAFT OF AIR FROM UNDERGROUND, MEANING A CAVE WAS NEARBY.

C4 JOHN AND DAN FOUND THE OPENING FROM WHICH THE COLD AIR WAS COMING.

D2 THEY TURNED ON THEIR LAMPS AND ENTERED THE COLD CAVE.

E1 AFTER SIX HOURS IN THE CAVE THEY CAME TO A ROOM FULL OF GREAT "ICICLES".

Story II - 5 Units

A5 IT WAS A WARM BRIGHT DAY WHEN I DECIDED TO TAKE MY PLANE FOR A FLIGHT.

B4 35 MINUTES AFTER TAKING OFF MY PLANE STARTED TO GIVE TROUBLE.

C1 SOON THE ENGINE STOPPED AND MY PLANE STARTED TO DROP.

D2 MY ONLY HOPE WAS TO "BAIL OUT" AND PARACHUTE DOWN TO THE GROUND.

E3 I JUMPED, PULLED THE PARACHUTE RING AND LANDED ON THE GROUND.

Story III - 5 Units

A5 JIM WANTED TO WORK ON A CATTLE "DRIVE" ON A LARGE RANCH.

B4 HE WAS HIRED AS A COWHAND TO HELP ON THE DRIVE.

C3 WHEN HE BEGAN WORK, HIS FIRST JOB WAS TO HELP ROUND UP

THE CATTLE FOR THE 800 MILE "DRIVE".

D2 EVERY NIGHT DURING THE DRIVE THE MEN WERE FED BEANS AND MEAT.

E1 AT THE END OF THE "DRIVE", JIM NEVER WANTED TO SEE OR SMELL BEANS OR MEAT AGAIN.

Scrambled Pre Think Aloud
Story I - 7 Units

A3 GRANNY AND JERRY WALKED TOWARD THE BARN.

B1 IN THE BARN, FOUR MOTHER COWS LAY WITH THEIR CALVES.

C4 ONE OF THE NEW CALVES HAD WHITE HAIR.

D2 THIS WHITE CALF LAY IN THE CORNER - AN OUTCAST.

E7 WITHOUT HIS MOTHER TO FEED HIM THE WHITE CALF WOULD DIE.

F5 JERRY DECIDED TO FEED AND LOOK AFTER THE CALF HIMSELF.

G6 WITHIN A WEEK, THE CALF WAS RUNNING AROUND FOLLOWING JERRY.

Story II - 7 Units

A2 TWO BROTHERS DECIDED TO WORK TO SAVE THE GRIZZLY BEAR FOR MAN TO ENJOY.

B4 THE FIRST STEP IN SAVING THE BEARS IS TO FIND OUT WHERE THEY LIVE.

C3 ONCE FOUND, THE BEARS ARE THEN TRAPPED TO BE MOVED TO A SAFER PLACE.

D5 THE TRAPPED BEARS HAVE TO BE PUT TO SLEEP.

E7 WHILE THE BEARS ARE ASLEEP THEY ARE WEIGHED, MEASURED AND TAGGED.

F6 THE TAGS ARE NUMBERED AND SNAPPED INTO AN EAR.

G1 THESE TAGS HELP IDENTIFY THE BEARS SO THEY CAN BE TRACKED AFTER BEING RELEASED.

Story III - 7 Units

A7 IN HIS OWN END, BILL PULLED FROM A MAZE OF PLAYERS.

B1 HE RACED OVER THE BLUE LINE OF THE OTHER TEAM.

C2 HE SKATED PAST THEIR LAST DEFENCEMAN AFTER PASSING THE OTHER TEAM'S BLUELINE.

D4 NOW IT WAS ONLY BILL AND THE GOALIE.

E3 BILL WOUND UP FOR A SLAPSHOT AT THE GOALIE.

F5 BUT WAIT, HE DIDN'T USE A SLAPSHOT AGAINST THE GOALIE.

G6 HE MADE A QUICK TURN TO THE LEFT AND LIFTED THE PUCK OVER THE DIVING GOALIE.

C

7

APPENDIX C
Think Aloud Pre Intervention Measures
Idea Units, Scrambled Sentences, Introspection, Cloze

APPENDIX C

Think Aloud Pre Intervention Measures
Idea Units, Scrambled Sentences, Introspection and Cloze

Name:____________________ Date:____________________

Scrambled Sentences - Think Aloud Pre Training
Story I - 3 Units

A1 LEW WAS ONLY 11 YEARS OLD BUT HE WAS ALMOST SIX FEET TALL.

B3 BECAUSE LEW WAS SO TALL HE BEGAN TO PLAY BASKETBALL.

C2 SOON LEW WAS THE STAR OF THE BASKETBALL TEAM HELPING THEM WIN VICTORY AFTER VICTORY.

Story II - 3 Units

A3 IT WAS A DARK AND STORM NIGHT WHEN CHARLIE HEARD A BANGING AT THE DOOR.

B1 CHARLIE CAME DOWN THE STAIRS AND APPROACHED THE FRONT DOOR.

C2 CAREFULLY HE OPENED THE DOOR TO SEE SNOOPY WITH HIS FOOD DISH IN HIS MOUTH.

Story III - 3 Units

A2 TODAY PORTABLE POWER SAWS RIP THROUGH THE BIG TREES MAKING LOGGING EASIER FOR MEN.

B3 THE TREES ARE THEN LOADED ON TRUCKS BY MACHINES.

C1 THE NEXT STOP FOR THE TREES IS THE SAW-MILL WHERE MORE MACHINES ARE USED TO TURN THE TREES INTO PAPER.

Scrambled Sentences - Think Aloud Pre Training
Story I - 5 Units

A4 ON SEPTEMBER 9, 1961, PEOPLE ALONG THE COAST OF TEXAS HEARD THE HURRICANE WARNING.

B2 THE HURRICANE STRUCK HARDEST AT THE SEA SIDE TOWN OF PORT O'CONNOR.

C3 AS THE WINDS INCREASED THE PEOPLE OF THE TOWN HURRIED TO THE SCHOOL FOR SHELTER.

D5 LOOKING OUT THE SCHOOL WINDOW THEY COULD SEE THE WATER RUSH PAST.

E1 THE STORM WAS OVER AFTER THREE DAYS, BUT ALMOST NOTHING WAS LEFT OF PORT O'CONNOR.

Story II - 5 Units

A3 THE STARTING PISTOL CRACKED.

B2 THE FIRST RUNNERS SHOT FROM THEIR STARTING POINTS.

C5 RELAY STICKS IN THEIR HANDS, THEY RACED TO THE SECOND RUNNERS.

D1 ON AND ON THE STICK WAS PASSED UNTIL IT CAME TO THE LAST TEAM RUNNERS.

E4 THE LAST TEAM RUNNER BROKE INTO THE LEAD WINNING THE RACE FOR CANADA.

Story III - 5 Units

A4 CASEY JONES WAS BORN IN SOUTHERN MISSOURI.

B1 WHEN HE GREW UP HE BECAME A TRAIN ENGINEER.

C3 CASEY ALWAYS ARRIVED EXACTLY ON TIME IN HIS TRAIN, CANNONBALL NO. 2.

D5 CASEY WAS AT THE CONTROLS ONE NIGHT WHEN THE TRAIN FAILED TO BRAKE AND COLLIDED WITH ANOTHER TRAIN KILLING HIM.

E2 TODAY CASEY'S HOUSE HAS BEEN TURNED INTO A MUSEUM.

Scrambled Sentences - Think Aloud Pre Training

Story I - 7 Units

A6 THE CROWD CAME TO THE PARK TO SEE A REAL WESTERN RODEO.

B3 AFTER THE CROWD ARRIVED AT THE PARK AND WERE SEATED, THEY GOT MORE THAN THEY EXPECTED.

C2 WHEN THE STEER ROPING BEGAN A YOUNG BULL LEAPED A BARRIER AND CHARGED UP THE ROWS OF SEATS.

D4 PEOPLE STARTED TO PANIC AND RUN FROM THEIR SEATS.

E1 A TALL COWBOY WITH A ROPE CHASED THE CHARGING BULL AMONG THE FLEEING PEOPLE.

F7 AT LAST THE COWBOY WAS ABLE TO GET A ROPE AROUND THE BULL'S NECK.

G5 WITH THE HELP OF SOME OTHER MEN, THE COWBOY WAS ABLE TO LEAD THE BULL OUT OF THE SEATS.

Story II - 7 Units

A2 ONE DAY THE TOWN COUNCIL DECIDED THEY NEEDED TO BUILD A NEW BRIDGE ACROSS A BIG RIVER.

B6 COUNCIL MEMBERS KNEW OF ONLY ONE MAN WHO COULD BUILD THE NEW BRIDGE.

C3 A MESSENGER WAS SENT TO THE CONTRACTOR TO ASK FOR HIS HELP.

D7 THE CONTRACTOR AGREED TO WORK FOR THE TOWN.

E5 ON THE NEXT DAY THE CONTRACTOR CAME TO LOOK AT THE RIVER OVER WHICH HE HAD AGREED TO BUILD THE BRIDGE.

F1 THERE WAS A VERY STRONG CURRENT IN THE RIVER AND THE CONTRACTOR LEFT THE RIVER TO RETURN TO HIS OFFICE TO DEVELOP A PLAN.

G4 AFTER SIX MONTHS OF HARD WORK BASED ON HIS CAREFUL PLANS, THE BRIDGE WAS COMPLETED.

Story III - 7 Units

A3 THE BOY TUMBLED AND ROLLED DOWN THE SKI SLOPE.

B5 HE CAME TO A STOP, WITH HIS LEG TWISTED AND IN PAIN.

C4 TWO MEN CAME DOWN THE SLOPE TO HELP THE BOY.

D1 ONE MAN VERY GENTLY TOOK OFF THE BOY'S SKIS.

E2 THE SECOND MAN, TOWING A TOBOGGAN, HELPED TIE UP THE BROKEN LEG AND LIFT THE BOY ON THE TOBOGGAN.

F7 THEN THEY COVERED THE BOY WITH BLANKETS AND STRAPPED HIM ON THE TOBOGGAN.

G6 ONE OF THE MEN GUIDED THE TOBOGGAN DOWN THE REST OF THE SLOPE TO SAFETY.

Name:____________________ Date:____________________

Idea Unit Passage III
Brown and Smiley (1977)

Ranking

1. One day
2. as he was leaving for the market,
1 3. a man's wife said to him,
2 4. "Husband, since we need a new iron kettle
5. for the fireplace
6. would you please remember to buy one?"
3 7. So the man purchased a kettle
8. at the market
9. and toward dusk
10. he took it on his arm
11. and started for home.
4 12. But the kettle was a heavy burden
13. and his arm grew tired with carrying it
5 14. and he set it down.
15. While he was resting
16. he noticed that the kettle had three legs
17. and scolding it said,
18. "What a pity I did not see those legs before!
19. Here you have three legs
20. and I have only two,
21. and yet I have been carrying you.
22. Well, you shall take me the rest of the way."
23. Then he nestled himself inside the kettle

24. and said, "Now, go on,
25. I am ready to be taken home."
6 26. But the kettle stood stationary on its three legs
27. and would not budge.
28. "Ah!" said the man,
29. "You are a stubborn little kettle, are you?
30. You want me to keep on carrying you, I suppose,
31. but I will not.
32. I will tell you the way
33. and you can stay where you are
34. until you choose to follow me."
7 35. So the man gave the kettle directions to his house
36. and then proceeded on his way.
37. **Soon he reached home.**
8 38. His wife asked him where the kettle was.
9 39. "Oh, it will be along soon," he replied.
40. She was puzzled by his answer.
41. He explained, "The kettle I bought has three legs,
42. and was better able to walk here from the market than I
43. who have but two legs.
44. When I noticed its legs
45. I immediately put it down on the ground
10 46. and instructed it to walk the rest

of the way itself.

47. I wasn't about to carry that kettle any farther."

48. "You need not worry, dear wife," said the man,

49. "for I told it the way,

50. and it will be along soon."

51. "Exactly where did you leave it?"

52. inquired the anxious wife.

53. "At the bridge," he replied.

54. She was not so sure about its coming as he was

11 55. and she hurried off to get it.

12 56. When she brought it home

57. the man said, "I am glad you brought it home safely, wife.

58. I have been thinking that it might have taken a notion to walk back to the market

59. if we had left it unattended much longer.

Name:____________________ Date:____________________

Idea Unit Passage V
Brown and Smiley (1977)

Ranking

1. Far away in a strange country

2. there lived a dragon

1 3. and the dragon's home was in a deep mountain cave.

4. From the cave his eyes shone out like headlights.

5. Very often, when the people who lived nearby

6. were gathered in the evening by the fire,

7. one would say: "What a terrible dragon is living near us!"

8. And another would agree, saying: "Someone should kill him."

2 9. Whenever children were told about the dragon,

3 10. they were frightened.

4 11. But there was one little boy who was never frightened.

12. All the neighbors said: "Isn't he a funny little boy?"

13. When it was almost time for this funny little boy's birthday,

5 14. his mother asked him: "Whom would you like to invite for your birthday party?"

6 15. Then that little boy said: "Mother,

I would like to ask the dragon."

16. His mother was very much surprised and asked: "Are you joking?"

17. "No," said the little boy very seriously,

18. "I mean what I say;

19. I want to invite the dragon."

20. And, sure enough,

21. on the day before his birthday,

22. the little boy stole quietly out of his house.

23. He walked and he walked and he walked

24. till he reached the mountain where the dragon lived.

25. "Hello, Hello, Mr. Dragon,"

26. the little boy called down the valley in his loudest voice.

27. "What's the matter?

28. Who's calling me?"

29. rumbled the dragon,

30. coming from his cave.

31. Then the little boy said: "Tomorrow is my birthday

32. and there will be lots of good things to eat,

33. so please come to my party.

34. I came all the way to invite you."

35. At first the dragon couldn't believe his ears

36. and kept roaring at the boy.

37. But the boy wasn't frightened at all

7 38. and kept saying: "Please, Mr. Dragon, please come to my party."

39. Finally the dragon understood that the boy meant what he said

40. and was actually asking him,

41. a dragon,

42. to his birthday party.

8 43. Then the dragon stopped roaring and began to cry.

44. "What a happy thing to happen to me." the dragon sobbed.

45. "I never had a kind invitation from anyone before."

46. The dragon's tears flowed and flowed

47. until at last they became a river.

48. Then the dragon said:

9 49. "Come, climb on my back and I'll give you a ride home."

50. The boy climbed bravely onto the back of the ferocious dragon

51. and away the dragon went,

10 52. swimming down the river of his own tears.

53. But as he went,

54. by some magic,

55. his body changed its size and shape.

56. and suddenly -

57. what do you know! -

11 58. the little boy was sailing bravely down the river toward home

12 59. as captain of a dragon-steamboat!

Name:____________________ Date:______________

Introspection Think Aloud Pre Training
Story I
Approx. Reading Level 4.5

INDIANS USED TO CALL BEAVERS THE "LITTLE MEN OF THE WOODS." • BUT THEY ARE REALLY NOT SO VERY LITTLE. • MOST BEAVERS GROW TO BE THREE OR FOUR FEET LONG AND WEIGH FROM 30 TO 40 POUNDS. •

THESE "LITTLE MEN OF THE WOODS" ARE BUSY MOST OF THE TIME. • THAT IS WHY WE SOMETIMES SAY, "AS BUSY AS A BEAVER." •

BEAVERS KNOW HOW TO BUILD DAMS THAT CAN HOLD WATER. USING THEIR FRONT PAWS TO DO SOME OF THE WORK. • CUTTING DOWN A TREE WITH THEIR FOUR SHARP-POINTED TEETH IS EASY. • A BEAVER CAN CUT DOWN A TREE FOUR INCHES THICK IN ABOUT 5 MINUTES. •

JOHN FIELD SAW SOME BEAVERS BUILDING A DAM NEAR A RAILROAD TRACK. • AS HE WATCHED THE WATER FLOOD THE TRACK, HE SAID "I MUST FRIGHTEN THOSE BEAVERS AWAY FROM THEIR DAM.". •

FIRST, HE PUT A WATER WHEEL BY THE LOGS OF THE DAM. • THEN HE TIED SOME CANS TO THE WHEEL. •

"WHEN THE WHEEL MOVES, THE CANS WILL MAKE A NOISE. • THE BEAVERS WILL BE AFRAID OF THE NOISE. • THEN THEY WILL LEAVE," HE SAID TO HIMSELF. •

THE NEXT DAY, A SURPRISE WAS WAITING FOR HIM. • THE BEAVERS HAD PUT A STICK IN THE WHEEL! IT COULDN'T TURN. •

"I'LL GET THEM THE NEXT TIME!" HE SAID. • THAT EVENING HE LEFT A LIGHT NEAR THE DAM. • "THIS WILL FRIGHTEN THEM AWAY," HE THOUGHT. •

BUT THEY COVERED UP THE LIGHT!

Name:____________________ Date:______________

Introspection Think Aloud Pre Training
Story II
Approx. Reading Level 4.5

YOU CANNOT TELL WHETHER SAND IS "QUICK" JUST BY LOOKING AT IT. • IT MAY LOOK DRY AND SOLID, BUT IF YOU ARE IN AN AREA WHERE QUICKSAND IS LIKELY TO EXIST IT IS A GOOD IDEA TO TAKE A LONG POLE WITH YOU TO PROBE THE GROUND FOR SAFE FOOTING. •

HOPEFULLY, YOU WILL NEVER GET NEAR SUCH PLACES. • EVEN IF YOU ARE VERY CAREFUL, THOUGH, THERE COULD COME A TIME WHEN YOU FIND YOURSELF SINKING INTO A BED OF MOVING SAND. • IN THIS CASE, HERE ARE SEVERAL RULES WHICH WILL HELP YOU ESCAPE: •

DO NOT PANIC. • THIS IS THE MOST IMPORTANT RULE OF ALL. KEEP YOUR HEAD AND THINK. • YOU MAY NOT KNOW THAT YOU ARE CAUGHT UNTIL THE SAND HAS REACHED YOUR KNEES. • IF YOU STRUGGLE, IT WILL ONLY MAKE YOU GO DEEPER INTO THE SAND. •

IF YOU HAVE FRIENDS WITH YOU, WARN THEM AWAY FROM THE QUICKSAND. •

CAREFULLY TAKE OFF ANY LOAD YOU ARE CARRYING, SUCH AS A KNAPSACK OR FISHING EQUIPMENT OR A GUN, TRY TO THROW THEM OUT OF THE QUICKSAND AREA. •

NEXT, FALL BACKWARD AS GENTLY AS POSSIBLE IN A SPREAD-EAGLE POSITION JUST AS IF YOU WERE FLOATING ON YOUR BACK IN WATER. • THEN AS YOU FLOAT, BEGIN TO FREE YOUR LEGS SLOWLY, ONE AT A TIME. •

GENTLY SQUIRM, ROLL OR SWIM YOUR WAY TO THE NEAREST FIRM GROUND. • STAY RELAXED AND STOP TO REST OFTEN. •

IF YOU DO HAVE A FRIEND WITH YOU, ASK HIM TO BUILD A SUPPORT TO HELP YOU. • PERHAPS HE CAN FIND SOME DEAD TREE LIMBS, FENCEPOSTS, ROPE OR WIRE TO PULL YOU TO SAFETY. •

Name:____________________ Date:________________

Introspection Think Aloud Pre Training
Story IV
Approx. Reading Level 5.5

AN IMPORTANT RULE FOR A GOOD ZOO TO FOLLOW IS: KEEP THE ANIMALS IN A PLACE THAT IS AS MUCH LIKE THEIR NATURAL HOME AS POSSIBLE. • WITH SOME ANIMALS THAT IS EASY. • A LARGE OPEN FIELD CAN BE HOME FOR A HERD OF HOOFED ANIMALS. • THIS WOULD BE NATURAL FOR THEM. •

WITH GORILLAS, THE PROBLEM IS QUITE DIFFERENT. • ZOO KEEPERS CANNOT GROW A RAIN FOREST FOR THEM. • IN ANY CASE, THE GORILLAS WOULD TEAR IT DOWN. •

IT WOULDN'T BE POSSIBLE TO CREATE A NATURAL PLACE FOR ELEPHANTS EITHER. • IT WOULDN'T LAST MORE THAN A FEW HOURS. • THEY WOULD PULL IT APART JUST TO HAVE SOMETHING TO DO. •

THIS DOES NOT MEAN THAT THESE KINDS OF ANIMALS BELONG IN STEEL CAGES. • HERE, THEY BECOME BORED AND PERHAPS A BIT MAD. • MORE AND MORE ZOOS AROUND THE WORLD ARE GETTING RID OF WIRE AND BARS. • THEY PLACE THEIR ANIMALS IN AREAS THAT ARE ROOMY AND COMFORTABLE FOR THE ANIMALS. • THESE AREAS ARE ALSO ATTRACTIVE AND INTERESTING FOR THOSE OF US WHO COME TO LOOK AND TO LEARN. •

THE BIG PROBLEM, OF COURSE, IS MONEY. • AT LEAST TWO ZOOS IN THE UNITED STATES SPEND OVER THREE MILLION DOLLARS EVERY YEAR. •

NOT EVERY CITY CAN SPEND MILLIONS OF DOLLARS EVERY YEAR ON ITS ZOO. • THERE ARE TOO MANY OTHER PARTS OF THE CITY, SUCH AS SCHOOLS, HOSPITALS AND SLUMS THAT NEED IMPROVEMENT. • SO, A GOOD ZOO AND A WISE CITY SHOULD THINK ABOUT HOW MUCH MONEY THEY HAVE TO SPEND ON THE ZOO. • THEN THEY SHOULD DECIDE ON THE BEST WAY TO USE IT. •

Name:____________________ Date:_______________

Cloze Think Aloud Pre Training
Story III
36 Blanks, 346 words, 9.6/1 ratio;
Approx. Reading Level 5.5 (Fry)

A FOLK TALE IS A VERY ___1___ STORY WHOSE AUTHOR AND BEGINNING IS NOT ___2___. FOLK ___3___ ARE HANDED ___4___ BY WORD FROM ONE GENERATION TO THE ___5___.

THE TERM ___6___ TALE REFERS TO A TRADITIONAL TALE WHICH HAS BEEN ___7___ BY STORY TELLERS FOR A LONG, LONG TIME -PERHAPS EVER SINCE ___8___ COULD TALK. HUNDREDS OF THESE TALES ARE ___9___ IN EVERY COUNTRY OF THE WORLD.

ONE FACT ABOUT FOLK ___10___ IS VERY INTERESTING. THESE TALES, HANDED ___11___ FROM PARENT TO ___12___ ARE ALMOST THE ___13___ EVEN IN DIFFERENT ___14___. HOW COULD IT HAPPEN THAT PEOPLE IN DIFFERENT ___15___ THAT ARE FAR APART TOLD THE SAME STORIES?

SOME EXPERTS SAY THAT AS PEOPLE ___16___ FROM ONE COUNTRY TO ANOTHER COUNTRY, THEY ___17___ THEIR FOLK TALES WITH THEM. EXAMPLES OF PEOPLE WHO MOVED AROUND THE ___18___ ARE SOLDIERS, TRADERS AND MONKS. THESE PEOPLE TOLD AND RETOLD THE ___19___ THEY HEARD IN THEIR ___19___.

TALES SPREAD FROM PLACE TO PLACE. BUT PEOPLE IN ___20___ COUNTRIES CHANGED THE DETAILS TO SUIT THEIR OWN ___21___. AN EXAMPLE IS A ___22___ TALE TOLD IN A COUNTRY WITH BIG TREES WOULD INCLUDE THE BIG ___23___.

BUT THE SAME TALE IN A COUNTRY WITHOUT BIG TREES, DID NOT INCLUDE ANY MENTION OF THE BIG TREES. SO WHILE THE DETAILS MAY BE ____24____, THE MAIN IDEAS IN THE FOLK TALES WOULD BE THE ____25____. FOR EXAMPLE, THE ____26____ TALE ABOUT "CINDERELLA" HAS 345 DIFFERENT VERSIONS DEPENDING ON THE ____27____ YOU ARE IN.

OTHER FOLK TALES THAT HAVE BEEN ____28____ DOWN IN A LOT OF COUNTRIES INCLUDE "LITTLE RED RIDING HOOD", "SLEEPING BEAUTY", "BLUEBEARD", AND "PAUL BUNYON".

IT SEEMS THAT SOME EXPERTS BELIEVE FOLK TALES ARE THE ____29____ BECAUSE PEOPLE WHO ____30____ FROM COUNTRY TO COUNTRY CARRIED THE TALES WITH THEM. BUT SOME OTHERS SAY THAT ____31____ TALES ARE THE SAME BECAUSE PEOPLE IN THE DIFFERENT ____32____ ARE PRETTY MUCH THE ____33____. PEOPLE ____34____ TO BE LOVED, TO LAUGH, TO GET AHEAD, TO BE LOOKED AFTER AND TO BE PART OF A ____35____. IN LISTENING TO ALMOST ANY FOLK TALE, YOU CAN ____36____ THESE KINDS OF IDEAS.

WORD LIST
Story III

1. OLD
2. KNOWN
3. TALES
4. DOWN
5. NEXT
6. FOLK
7. TOLD
8. MAN
9. TOLD
10. TALES
11. DOWN
12. CHILD
13. SAME
14. COUNTRIES
15. MOVED
16. TOOK
17. WORLD
18. TALES
19. TRAVELS
20. DIFFERENT
21. COUNTRY
22. FOLK
23. TREES
24. DIFFERENT
25. SAME
26. FOLK
27. COUNTRY
28. HANDED
29. SAME
30. MOVED
31. FOLK
32. COUNTRIES
33. SAME
34. NEED
35. GROUP
36. HEAR

Name:____________________ Date:_______________

Cloze Think Aloud Pre Training
Story V
36 blanks, 328 words, 9.1/1 ratio;
Approximate Reading Level 5.7 (Fry)

OF 17 _____1_____ OF PENGUINS, ONLY THE EMPEROR AND THE ADELIE _____2_____ IN THE ANTARCTICA. THE EMPEROR IS KING _____3_____. HE _____4_____ AS TALL AS FOUR FEET. ONE BIG FELLOW CAUGHT YEARS AGO _____5_____ MORE THAN 90 POUNDS.

THERE ARE MORE OF THE SMALL ADELIES THAN OF THE LARGER EMPERORS. AN ADELIE _____6_____ GROWS TO BE ABOUT TWO FEET _____7_____ AND WEIGHS ABOUT 12 _____8_____. A WHITE RING AROUND EACH BLACK BUTTON EYE MAKES HIM LOOK _____9_____ A CLOWN.

TO WATCH AN ADELIE WALK, YOU'D NEVER _____10_____ HE COULD GET ANYWHERE. HE STUMPS ALONG ON THREE-INCH LEGS, TAKING SHORT, QUICK _____11_____ AND WHEEZING ALL THE WAY. THE LITTLE FELLOW NEVER _____12_____ WHERE HE IS GOING. HE _____13_____ HIS HEAD ALMOST BACKWARD TO KEEP FROM MISSING ANYTHING BEHIND HIM. HE MAY _____14_____ OVER A FOOTPRINT IN THE SNOW AND FALL _____15_____. UP HE POPS. WITH _____16_____ IN THE AIR, HE MARCHES OFF AS THOUGH _____17_____ HAD HAPPENED.

THESE LITTLE CLOWNS USUALLY _____18_____ UPRIGHT, USING THEIR FLIPPERS LIKE BALANCING POLES. AS THEY WALK, THEY _____19_____ FROM SIDE TO SIDE LIKE SHORT-LEGGED _____20_____ MEN. BUT WHEN THEY HAVE A _____21_____ WAY TO GO, THEY FLOP _____22_____ AND MOVE ALONG ON THEIR

____23____. THEY PUSH THEIR TOES AGAINST THE ____24____ AND USE THEIR FLIPPERS LIKE OARS. SOMETIMES THE BIG EMPERORS MAKE AS MUCH AS TEN MILES AN ____25____ THIS WAY.

OF ALL ____26____, ADELIES SEEM THE GREATEST TRAVELLERS. THEY WINTER AT THE NORTHERN RIM OF THE ____27____ PACK. IN SPRING THEY ____28____ 500 OR MORE MILES TO THEIR HOMES.

HOME FOR AN ADELIE IS A ROOKERY. WE ____29____ ONE ON CAPE BIRD. WHAT NOISY ____30____! IT ____31____, FROM HALF A MILE AWAY, LIKE A WORLD SERIES CROWD ____32____ A BAD CALL.

IN THE ROOKERY WE ____33____ ABOUT 50,000 ____34____ CROWDED ON PEBBLE NESTS ONLY A FOOT OR SO APART. IT WAS A 40-ACRE SEA OF MOVING BODIES. ALL WERE ____35____ COURTING, OR HATCHING OUT A SUMMER CROP OF FUZZY GRAY ____36____.

WORD LIST
Story V

1. KINDS
2. GROW
3. PENGUIN
4. STANDS
5. WEIGHED
6. GROWS
7. TALL
8. POUNDS
9. LIKE
10. THINK
11. STEPS
12. LOOKS
13. TURNS
14. TRIP
15. DOWN
16. HEAD
17. NOTHING
18. WALK
19. ROCK
20. FAT
21. LONG
22. DOWN
23. STOMACHS
24. SNOW
25. HOUR
26. PENGUINS
27. ICE
28. RETURN (TRAVEL)
29. VISITED (SAW)
30. PLACE
31. SOUNDED
32. AFTER
33. COUNTED
34. BIRDS
35. BUSY
36. CHICKS

Name:______________________ Date:________________

Cloze Think Aloud Pre Training
Story VI
31 blanks, 290 words, 9.3/1 ratio
Approx. Reading Level 5.0 (Fry)

THE BEST-KNOWN NORTH AMERICAN DEER IS THE WHITETAIL. HE GETS HIS ___1___ FROM THE FACT THAT THE WHITE UNDERSIDE OF HIS ___2___ FLAGS UP WHEN HE'S ON THE RUN. WHITETAILS PLAYED AN ___3___ PART IN OUR EARLY DAYS. THEY ___4___ AND CLOTHED PIONEERS. THEY SUPPLIED ___5___ FOR ARMY GARRISONS IN THE FIELD. AND THEY ___6___ TRAPPERS AND EXPLORERS AS THEY OPENED THE WEST. ALTHOUGH THE ___7___ HAS DECREASED SINCE COLONIAL TIMES, THERE ARE NOW 30 RECOGNIZED SUBSPECIES.

IN SPRING, SUMMER AND FALL, THE ___8___ LIVE ALMOST EVERYWHERE. THEY ___9___ ON EVERYTHING FROM TWIGS TO WILD MUSHROOMS. THEY HAVE EVEN ___10___ SEEN FISHING, PAWING SUCKERS FROM A CREEK, THEN ___11___ THEM HEAD FIRST.

WINTER IS THE HARDEST ___12___ FOR THE WHITETAILS. THEN THEY ___13___ MAINLY ON TREE AND BUSH GROWTH. THEY ___14___ ON BUDS, BRANCHES AND BARK. IF THE ___15___ GETS MORE THAN TWO FEET DEEP, THE DEER "YARD". THEY GATHER IN SMALL ___16___ AND TRAMPLE ___17___ THE ___18___ SNOW, MAKING A YARD IN WHICH THEY CAN MOVE ABOUT. ___19___ USE THE SAME TEAMWORK TO OPEN TRAILS AFTER A STORM. WITHIN 48 HOURS THEY PACK ___20___ THE SNOW SO THEY CAN ___21___. BUT THE SNOWS ___22___

DOWN THEIR FEEDING RANGE. IN HARD WINTERS MANY DEER ____ 23 ____ OR DIE OF EXPOSURE.

NATURE HAS, HOWEVER, ____ 24 ____ THE WHITETAIL WONDERFUL EQUIPMENT TO HELP HIM ____ 25 ____. FOR EXAMPLE, HIS COAT HELPS HIM ____ 26 ____ INTO THE BACKGROUND. HIS ENEMIES FIND IT HARD TO ____ 27 ____ HIM.

ALSO, THE WHITETAIL'S SENSES ARE VERY ____ 28 ____. HUNTERS SAY THAT HE CAN DETECT A FLICKER OF ____ 29 ____ OR SMELL A CIGARETTE HALF A MILE AWAY.

WHITETAILS ARE AT ____ 30 ____ EVEN IN WATER. THESE DEER HAVE BEEN ____ 32 ____ PADDLING MORE THAN FIVE MILES OUT IN THE OCEAN, JUST FOR THE FUN OF IT!

WORD LIST
Story VI

1. NAME
2. TAIL
3. IMPORTANT
4. FED
5. MEAT
6. HELPED
7. WHITETAIL
8. WHITETAIL
9. FEED
10. SEEN
11. EATING
12. SEASON
13. FEED
14. LIVE
15. SNOW
16. GROUPS
17. DOWN
18. DEER
19. WHITETAILS
20. DOWN
21. TRAVEL
22. CUT
23. STARVE
24. GIVEN
25. SURVIVE
26. BLEND (FADE)
27. SPOT (SEE)
28. KEEN
29. LIGHT
30. HOME
31. SEEN

APPENDIX D
Think Aloud Post Intervention Measures
Introspection, Cloze, Scrambled Sentences and Idea Units

APPENDIX D

Think Aloud Post Intervention Measures
Introspection, Cloze, Scrambled Sentences and Idea Units
Name:____________________ Date:______________

Protocol Think Aloud Post Training Story III
Approx. Reading Level 4.1

ARE YOU SUPERSTITIOUS? • DO YOU CARRY A RABBIT'S FOOT FOR GOOD LUCK? • IF SO, YOU ARE NOT ALONE. • MILLIONS OF PEOPLE HAVE GOOD LUCK CHARMS. • THEY BELIEVE IN LUCK. •

SUPERSTITIONS HAVE BEEN WITH US SINCE THE BEGINNING OF TIME. • THEY SEEM TO HELP PEOPLE EXPLAIN THEIR FEARS. • THERE IS ONE MAN WHO HAS MADE A STUDY OF SUPERSTITIONS. • HE HAS A LIST OF 400,000 DIFFERENT ONES. •

THOUSANDS OF YEARS AGO PEOPLE THOUGHT SPIT WAS MAGIC. • THEY THOUGHT IT WAS THE CENTRE OF THE SOUL'S POWER. • TODAY MANY ATHLETES SPIT FOR GOOD LUCK. •

ACTORS ALSO BELIEVE IN LUCK. • TO WISH EACH OTHER SUCCESS, THEY SAY "BREAK A LEG." • THAT IS SUPPOSED TO MIX UP EVIL SPIRITS. • MOST ACTORS BELIEVE THAT WHISTLING IN THE DRESSING ROOM BRINGS BAD LUCK. •

NUMBERS ARE A BIG PART OF SUPERSTITIONS. • THE NUMBER THREE HAS ALWAYS HAD A SPECIAL MEANING. • BIRTH NEEDS THREE PEOPLE -- MOTHER, FATHER AND CHILD. • SO THREE CAME TO MEAN LIFE ITSELF. • SOME PEOPLE SAW THE NUMBER THREE AS THE EARTH, SEA AND SKY. • IN MANY PLACES THREE IS THOUGHT TO BE UNLUCKY. • "BAD THINGS HAPPEN IN THREES," IT IS SAID. • MANY PEOPLE ARE SUPERSTITIOUS ABOUT THE NUMBER 13. • FEW HOTELS HAVE 13th FLOORS. • THE NUMBER OF THE FLOOR AFTER 12 IS 14. • SOME AIRPLANES WILL NOT HAVE 13 ROWS OF SEATS. •

Introspection Think Aloud Post Training

Story V

Approximate Reading Level 5.7

THE CANADIAN PACIFIC RAILWAY WAS A GREAT CONSTRUCTION FEAT. • IT LINKED THE EAST AND WEST COASTS OF CANADA. • BUT IT WAS MORE THAN THAT. • IT WAS A PROJECT THAT BEGAN OUR NATION. • HAD IT NOT BEEN FOR THE CPR, ALL THE LAND WEST OF THE GREAT LAKES WOULD BE PART OF THE UNITED STATES. •

IN 1867 THE PROVINCES OF ONTARIO, QUEBED, NOVA SCOTIA AND NEW BRUNSWICK FORMED CANADA. • THESE EASTERN PROVINCES WERE AFRAID OF AN ATTACK FROM THE UNITED STATES. • THEY ASKED BRITISH COLUMBIA TO JOINT THEM> • THE PRAIRIES WERE STILL PART OF THE NORTHWEST TERRITORIES. • BRITISH COLUMBIA WAS ALL BY ITSELF ON THE WEST COAST. • TO JOIN IT TO THE REST OF THE COUNTRY, THE GOVERNMENT IN OTTAWA DECIDED TO BUILD A RAILROAD. • THE RAILROAD WAS TO BE FININSHED IN TEN YEARS. •

FIVE YEARS AFTER THE GOVERNMENT HAD THE WORK STARTED NOT MUCH HAD BEEN DONE. • THE PEOPLE ON THE WEST COAST WERE GETTING MAD. • THEY TOLD THE FEDERAL GOVERNMENT TO FINISH THE RAILWAY BY MAY 1879 OR ELSE. • A THREAT WAS MADE. • IF THE RAILWAY WASN'T FINISHED ON TIME, BRITISH COLUMBIA WOULD NO LONGER BE PART OF CANADA. •

THE FEDERAL GOVERNMENT DECIDED TO TURN OVER THE CONSTRUCTION OF THE" RAILROAD TO A PRIVATE COMPANY. • IT WAS OWNED BY SIX BUSINESSMEN. • THEY CALLED IT THE CANADIAN

PACIFIC. • THEY AGREED TO BUILD THE RAILROAD FOR $25 MILLION. • THEY SUCCEEDED. •

Introspection Think Aloud Post training
Story VI
Approx. Reading Level 5.1

THE WHALE IS THE LARGEST ANIMAL EVER TO LIVE ON THIS PLANET. • THE BLUE WHALE, THE LARGEST TYPE, CAN REACH 30 METERS IN LENGTH AND CAN WEIGH AS MUCH AS 138 TONNES. • ONE BLUE WHALE IS AS LARGE AS 25 FULL GROWN ELEPHANTS. •

AS LONG AGO AS THE STONE AGE, THE WHALE'S BODY WAS USED FOR FOOD, FUEL, LIGHT AND TOOLS. • EARLY HUNTERS, HOWEVER, WERE NO MATCH FOR THE HUGE ANIMAL. • WITH TINY BOATS AND HAND HARPOONS, THE HUNTERS CAUGHT FEW WHALES. • THEY BROUGHT IN ONLY THE OLD AND SICK WHALES WHO COULD NOT AVOID CAPTURE. •

IN THE 19TH CENTURY, WHALE HUNTING BECAME A GROWING BUSINESS. • THE BUSINESS THRIVED ON MAKING WHALE OIL TO BE USED IN LAMPS AND AS LUBRICANT. • BY THE TENS OF THOUSANDS, WHALES WERE KILLED. •

TODAY ALMOST EVERY WHALE PRODUCT HAS BEEN REPLACED BY PETROLEUM OR OTHER CHEMICALS. • THERE ARE FEW REASONS TO HUNT THE WHALE. • BUT THE HUNT CONTINUES. •

USING LIGHT PLANES TO SPOT THE WHALES, WHALE CATCHERS MOVE ABOUT THE OCEANS, KILLING EVER LARGER NUMBERS OF WHALES. • THE WASTE OF LIFE IS HARDLY PROFITABLE. • BUT TO JUDGE FROM THE SLAUGHTER, THERE IS NO BETTER USE FOR THESE FLEETS OF SHIPS, AND NO BETTER USE FOR WHALES. • THE MIGHTIEST ANIMALS THAT EVER LIVED MAY SOON PASS FROM THE EARTH FOREVER. •

WHALES ARE BECOMING SCARCE. • ALREADY THE BLUE WHALE IS ALMOST EXTINCT. • HUMPBACKS HAVE ALL BUT DISAPPEARED. • THE ONLY LARGE WHALES THAT ARE STILL NUMEROUS ARE THE FINBACKS AND SPERM WHALES. • WHALES ARE HUNTED IN EVERY OCEAN. THEY COULD BE WIPED OUT IN THE NEXT TEN YEARS. •

Cloze Think Aloud Post Instruction
Story VII
37 blanks, 355 words, 9.6/1 ratio
Approximate Reading Level 5.0 (Fry)

THE MEN WHO BUILT THE MILWAUKEE ZOO WANTED TO SHOW OFF THE ____1____ IN THE BEST POSSIBLE WAY. THEY WANTED A ____2____ THAT LOOKED REAL. THERE WOULD BE NO FENCES OR CAGES. AND ANIMALS THAT YOU WOULD ____3____ IN A CERTAIN PART OF THE WORLD WOULD SHARE A CERTAIN PART OF THE ____4____.

BUT ONE QUESTION HAD TO BE ____5____. HOW COULD ANIMALS THAT ____6____ A PIECE OF LAND BE KEPT FROM HARMING ____7____ ANOTHER? HOW COULD LIONS BE ____8____ FROM LEAPING ON ZEBRAS? ____9____ COULD ANTELOPE BE KEPT FROM RUSHING INTO ELEPHANTS?

THE MEN WHO PLANNED THE ZOO ____10____ AN ANSWER. THEY BROKE UP EACH AREA OF LAND INTO ISLANDS. DITCHES, CALLED MOATS, SEPARATED THE ____11____ AND THE ANIMALS.

IN PLANNING THE MOATS, TWO ____12____ ALWAYS HAD TO BE ANSWERED. HOW ____13____ CAN A CERTAIN KIND OF ANIMAL ____14____? HOW MUCH RUNNING SPACE DOES THE ____15____ NEED TO BUILD UP ____16____ FOR HIS JUMP?

THINK ABOUT THE TIGER FOR A MINUTE, HE CAN ____17____ ALMOST 30 FEET. BUT HE NEEDS 20 YARDS OF FLAT ____18____ SPACE TO BUILD UP ____19____ FOR THE JUMP. WHAT DID THE PLANNERS DO WITH THESE FACTS? THEY MADE SURE THAT THE ____20____ BY THE MOAT WAS BROKEN UP WITH BIG ROCKS. NO ____21____ CAN GET A RUNNING START WITH ____22____ IN

THE WAY!

VISITORS TO THE MILWAUKEE ZOO CAN SEE ____23____ IN THEIR NATURAL SETTING. THEY CAN SEE ____24____ BEING KEPT TOGETHER AND APART AT THE ____25____ TIME!

ALL OVER THE ____26____, ZOOS ARE TRYING TO MAKE THEIR VISITORS ____27____. AND THE ____28____ SEEM HAPPY, TOO. LISTEN TO THIS STORY.

ONE DAY THE DIRECTOR WAS WALKING ____29____ THE ZOO. SUDDENLY HE ____30____ A FLOCK OF STRANGE WILD DUCKS. THE DIRECTOR ____31____ WHAT WAS GOING ON. HE ____32____ TO THE BIRD-KEEPER. "WHAT ARE THOSE ____33____ DOING IN OUR LAKE?" HE ASKED.

"THEY FLEW IN FOR A VISIT LAST WEEK," THE BIRD-KEEPER ____34____. "I GUESS THEY LIKED IT SO MUCH THEY DECIDED TO ____35____."

THE DIRECTOR OF THE ZOO LAUGHED. HE SAID, "IF WE'VE BUILT THE KIND OF ____36____ THAT ANIMALS WANT TO COME TO, WE MUST BE ON THE ____37____ TRACK."

WORD LIST
Story VII

1. ANIMALS
2. ZOO
3. FIND
4. ZOO
5. ANSWERED
6. SHARE
7. EACH
8. KEPT
9. HOW
10. HAD
11. LAND
12. QUESTIONS
13. FAR
14. JUMP
15. ANIMAL
16. SPEED
17. JUMP
18. RUNNING
19. SPEED
20. LAND
21. TIGER
22. ROCKS
23. ANIMALS
24. ANIMALS
25. SAME
26. WORLD
27. HAPPY
28. ANIMALS
29. THROUGH
30. SAW
31. ASKED
32. SAID
33. DUCKS
34. REPLIED
35. STAY
36. ZOO
37. RIGHT

Cloze Think Aloud Post Intervention
Story VIII
33 blanks, 297 words, 9.0/1 ratio
Approx. Reading Level 5.5 (Fry)

AVALANCHE.

THE WORD MAKES SOME PEOPLE THINK OF ROCKS BOUNCING ___1___ MOUNTAINSIDES, SWEEPING CLOUDS OF DIRT AND ___2___ ALONG WITH THEM, THREATENING TO ___3___ ANY HOUSE OR PERSON IN THEIR WAY.

BUT TO MOST CANADIANS, THE WORD "___4___" HAS A SPECIAL ___5___. AN AVALANCHE IS STILL SOMETHING THAT ___6___ ON MOUNTAINSIDES. AND IT STILL SWEEPS ___7___ ALONG WITH IT. AND IT STILL THREATENS DISASTER TO ANY HOUSE OR ___8___ IN ITS PATH.

BUT IT IS NOT MADE OF ___9___. INSTEAD, THE AVALANCHE IS ___10___ OF SOMETHING MUCH ___11___, SOMETHING THAT PEOPLE THINK OF AS QUIET AND PRETTY AND ANYTHING BUT UNSAFE.

IN CANADA MOST ___12___ ARE MADE OF SNOW.

THE ___13___ PILES UP FROM OCTOBER TO MAY IN MANY PARTS OF THE ___14___. THE SNOW HOLDS THE ___15___ STILL, KEEPING THEM FROM ROLLING ___16___. BUT THE SNOW ITSELF, SOFT AND SLIPPERY, CAN START TO ___17___ DOWN. IT SLIDES IN GREAT WHITE ___18___, GETTING BIGGER AND ___19___. SOMETIMES, IT ___20___ HOUSES AND PEOPLE.

CANADA'S MOST IMPORTANT HIGHWAY RUNS THROUGH A "MOUNTAIN PASS" WHERE SNOW AVALANCHES ARE ESPECIALLY DANGEROUS. THIS ___21___ IS CALLED ROGERS PASS. THE

___22___ SNAKES THROUGH THIS NARROW ___23___ TO LINK THE PACIFIC COAST WITH THE REST OF CANADA. PEOPLE WHO LIVE ON THE ___24___ COUNT ON THE PASS STAYING ___25___ THE YEAR ROUND.

IT'S THE JOB OF FRED SCHLEISS AND HIS BROTHER WALTER TO BE SURE ROGERS PASS DOES ___26___ OPEN ALL YEAR. JUST AS WEATHER ___27___ TRY TO SAY WHEN RAIN OR SUNSHINE MAY COME, THE SCHLEISSES TRY TO ___28___ WHEN AN ___29___ MAY HAPPEN.

WHEN THEY KNOW AN AVALANCHE IS ABOUT TO ___30___, FRED AND WALTER MAKE IT HAPPEN SOONER! WHY? IT IS ___31___ TO HAVE THE SNOW ___32___ A LITTLE AT A TIME THAN TO HAVE THE ___33___ SLIDING ALL AT ONCE.

WORD LIST
Story VIII

1. DOWN
2. CLAY
3. DESTROY
4. AVALANCHE
5. MEANING
6. HAPPENS
7. ROCK
8. PERSON
9. ROCK
10. MADE
11. SOFTER
12. AVALANCHES
13. SNOW
14. MOUNTAINS
15. ROCK
16. DOWNHILL (DOWN)
17. DOWN
18. SHEETS
19. BIGGER
20. SMASHES
21. PLACE (ROAD)
22. HIGHWAY (ROAD)
23. PASS
24. HIGHWAY (ROAD)
25. OPEN
26. REMAIN (STAY)
27. FORECASTERS
28. SAY
29. AVALANCHE
30. HAPPEN
31. BETTER
32. SLIDE
33. SNOW

Cloze Think Aloud Post Intervention
Story IX
33 blanks, 310 words, 9.4/1 ratio
Approx. Reading Level 5.2 (Fry)

OFTEN WE READ ABOUT AIR POLLUTION. WE ______1______ THAT CARS SPEW FUMES THAT MAKE OUR AIR DIRTY.

AUTOMOBILES RUN ON GASOLINE. THE ______2______ BURNS UP INSIDE THE ______3______ AND GIVES THE ENGINE POWER TO GO. IT IS THE WASTES OF THIS BURNING ______4______ THAT MAKES THE AIR ______5______.

GASOLINE IS MADE FROM PETROLEUM (OIL). WE KNOW THAT SOMEDAY WE WILL RUN OUT OF ______6______. MANY PEOPLE BELIEVE THAT WE ARE WASTING OUR PETROLEUM BY USING IT FOR ______7______.

ORDINARY CARS NOT ONLY POLLUTE OUR ______8______, THEY ALSO USE UP LARGE AMOUNTS OF ______9______.

IF CARS DID NOT RUN ON ______10______, THEY WOULD NOT ______11______ THE AIR OR WASTE ______12______. SO IT SEEMS THERE IS A SIMPLE ______13______ TO THE PROBLEM OF ______14______, MAKE CARS THAT DO NOT RUN ON ______15______.

BUT IF CARS DON'T USE GAS, WHAT CAN THEY ______16______? SCIENTISTS HAVE GIVEN A NUMBER OF DIFFERENT ______17______ TO THIS QUESTION. SOME BELIEVE ______18______ SHOULD RUN ON STEAM; OTHERS BELIEVE THAT CARS SHOULD ______19______ ON ATOMIC POWER. ONE SIMPLE AND OBVIOUS ______20______ IS THAT ______21______ SHOULD BE POWERED BY ELECTRICITY, JUST AS A TELEVISION IS.

BUT ______22______ CARS AREN'T "PLUGGED" IN THE WAY TVS ARE. THESE CARS' ENGINES GET THEIR ELECTRIC POWER FROM A ______23______, JUST AS A FLASHLIGHT DOES. ITS CHARGER CAN BE ______24______ INTO ANY ELECTRIC SOURCE IN THE HOUSE OR ON THE ROAD. THESE BATTERY-POWERED CARS ARE QUIET AND DO NOT ______25______ THE AIR.

BUT ______26______ CARS DO HAVE ______27______. THE CARS CAN'T GO AS ______28______ AS ORDINARY CARS. FEW ELECTRIC CARS GO OVER 45 KILOMETERS PER HOUR. MOST GASOLINE-POWERED CARS CAN GO THREE TIMES AS ______29______.

NEITHER CAN THE ______30______ CARS GO VERY FAR. AFTER DRIVING 80 TO 95 KILOMETERS, THE ______31______ RUNS DOWN. THEN THE ______32______ CANNOT RUN FOR FOUR OR FIVE HOURS WHILE THE ______33______ IS RECHARGING. SCIENTISTS ARE WORKING TO SOLVE THESE PROBLEMS.

WORD LIST
Story IX

1. KNOW
2. GASOLINE
3. ENGINE
4. GAS
5. DIRTY
6. PETROLEUM (OIL)
7. GAS
8. AIR
9. PETROLEUM (OIL)
10. GAS
11. POLLUTE
12. PETROLEUM (OIL)
13. SOLUTION
14. POLLUTION
15. GAS
16. USE
17. ANSWERS
18. CARS
19. RUN
20. ANSWER
21. CARS
22. ELECTRIC
23. BATTERY
24. PLUGGED
25. POLLUTE
26. ELECTRIC
27. PROBLEMS
28. FAST
29. FAST
30. ELECTRIC
31. BATTERY
32. CAR
33. BATTERY

Scrambled Think Aloud Post Intervention
Story I - 3 Units

A2 BOB LEFT HIS HOUSE TO START THE CAR.

B1 THE MORE HE TRIED TO START THE CAR, THE LESS THE MOTOR TURNED OVER.

C3 FINALLY HE REALIZED HIS BATTERY WAS TOO LOW TO START THE CAR.

Story II - 3 Units

A2 MANY YEARS AGO PEOPLE TRAVELLED AROUND MONTREAL BY SLEIGH IN THE WINTER.

B3 SLEIGHS WERE USED BECAUSE IT WAS TOO DIFFICULT TO DRIVE CARS ON THE ICE COVERED STREETS OF OLD MONTREAL.

C1 TODAY, ONLY A FEW SLEIGHS ARE SEEN IN MONTREAL BECAUSE MODERN SNOW PLOWS MAKE STREET CLEANING POSSIBLE.

Story III - 3 Units

A3 THE FIRE ALARM RANG AND RANG.

B2 BILL WAS FAST ASLEEP, BUT FINALLY HE HEARD THE RINGING AND BEGAN TO AWAKEN.

C1 BY THE TIME HE RAN TO THE DOOR, EVERYONE ELSE WAS RETURNING FROM THE FALSE ALARM.

Scrambled Think Aloud Post Intervention

Story IV - 5 Units

A4 THE SNAIL LOOKS FOR A DAMP SPOT NEAR THE BASE OF A TREE TO LAY ITS EGGS.

B1 ONCE IT FINDS SUCH A SPOT IT DIGS A HOLE.

C2 THEN THE SNAIL DROPS ITS EGGS IN THE HOLE, COVERS IT AND GOES AWAY.

D5 IN THREE TO FOUR WEEKS THE EGGS HATCH IN THE HOLE.

E3 THE BABY SNAILS CRAWL OUT OF THE HOLE AND LOOK FOR FOOD.

Story V - 5 Units

A5 A GIANT APE 12 METERS TALL WAS NEEDED FOR THE MOVIE KING KONG.

B3 TO BUILD THE APE A METAL FRAME WEIGHING OVER 3000 TONNES WAS MADE.

C2 NEXT THE APE'S FLESH WAS MADE OF PLASTIC COVERED BY HORSETAIL HAIR TO BE PLACED OVER THE FRAME.

D4 WHEN THE APE'S BODY WAS FINISHED, OVER 1372 METERS OF WIRE WAS PLACED INSIDE HIS BODY.

E1 THESE WIRES WERE CONNECTED TO MACHINERY TO HELP THE APE MOVE.

Story VI - 5 Units

A2 EACH OCTOBER MARMOTS CRAWL INTO THEIR UNDERGROUND TUNNEL TO PREPARE IT FOR WINTER.

B4 THEY STORE FRESH HAY IN THE TUNNEL TO KEEP OUT THE WINTER FROST.

C5 AFTER THE HAY IS STORED THEY ROLL IN A TIGHT BALL AND GO

INTO A DEEP SLEEP DEEP IN THEIR TUNNEL.

D1 WHEN THEY SLEEP THEIR HEARTS BEAT ONLY ONCE A MINUTE.

E3 WHEN THE MARMOT WAKES IT BECOMES VERY BUSY CLEANING UP THE TUNNEL AFTER THE LONG WINTER.

Scrambled Think Aloud Post Intervention
Story VII - 7 Units

A7 THE SUN WAS JUST RISING AS BILL WOKE.

B4 HE LEAPED OUT OF BED.

C5 HE ATE A GOOD BREAKFAST.

D6 HE RAN TO GET HIS FISHING POLE.

E1 WITH ALL HIS GEAR HE SET OUT FOR HIS FIRST SUMMER FISHING TRIP.

F2 ON HIS WAY FISHING, HE MET HIS FRIEND JOHN.

G3 JOHN DECIDED TO GO ALONG ON THE FISHING TRIP.

Story VII - 7 Units

A3 TO MAKE A WAX FIGURE, THE SCULPTOR FIRST SHAPES THE HEAD IN CLAY.

B1 A PLASTER MOLD OF THE HEAD IS THEN MADE FROM THE CLAY MOLD.

C2 HOT WAX IS POURED INTO THE PLASTER MOLD.

D4 WHEN THE WAX IS HARD THE PLASTER IS REMOVED.

E7 EYES ARE MADE AND FITTED INTO THE WAX MODEL.

F6 HAIR IS PUT ON THE WAX MODEL AFTER THE EYES ARE INSERTED.

G5 AFTER THE HEAD IS FINISHED THE OTHER LIMBS ARE ADDED.

Story IX - 7 Units

A5 RICK, JOHN AND BILL WALKED ALONG THE SNOWY RIVER BANK.

B6 SUDDENLY RICK WALKED OUT ONTO THE FROZEN RIVER.

C3 THE ICE UNDER RICK'S FEET CRACKED.

D2 RICK FELL INTO THE RIVER.

E4 BILL, SEEING RICK BEING SWEPT DOWN THE RIVER, GRABBED A

TREE BRANCH AND HELD IT OUT TO RICK.

F1 RICK GRABBED THE TREE BRANCH.

G7 BILL PULLED RICK TO SHORE WITH THE BRANCH, SAVING HIS LIFE.

Name:____________________ Date:____________________

Idea Unit Passage IV
Brown and Smiley (1977)

Ranking

1. Once upon a time

1 2. there was a rich lord

1 3. who liked to collect carvings of animals

4. (those are like little wooden dolls).

5. He had many kinds,

3 6. but he had no carved mouse.

4 7. So he called two skilled carvers to him and said:

5 8. "I want each of you to carve a mouse for me.

9. I want them to be so life-like

10. that my cat will think they're real mice

11. and pounce on them.

6 12. We'll put them down together and see which mouse the cat pounces on first.

13. To the carver of that mouse

14. I'll give this bag of gold."

15. So the two carvers went back to their homes

16. and set to work.

17. After a time they came back.

7 18. One had carved a wonderful mouse out of wood.

19. It was so well done that it looked exactly like a mouse.

8 20. The other, however, had done very bady.

21. He had used some material that flaked and looked funny.

22. It didn't look like a mouse at all.
23. "What's this?" said the lord.
24. This wooden mouse is a marvelouse piece of carving
25. but this other mouse
26. -- if it is indeed supposed to be a mouse -
27. wouldn't fool anyone,
28. let alone a cat."
29. "Let the cat be brought in."
30. said the second carver.
31. "The cat can decide which is the better mouse."
32. The lord thought this was rather silly,
33. but he ordered the cat to be brought in.
34. No sooner had it come into the room
9 35. than it pounced upon the badly carved mouse
36. and paid no attention at all to the one that was carved so well.
37. There was nothing for the lord to do but give the gold to the unskilled carver
38. but as he did so he said:
39. "Well, now that you have the gold,
10 40. tell me how you did it."
41. "It was easy, my lord,"
42. said the man,
43. "I didn't carve my mouse from wood.
11 44. I carved it from dried fish.
45. That's why the cat pounced upon it swiftly."
46. When the lord heard how the cat and everyone else

had been fooled,

47. he could not help laughing,

48. and soon everybody in the entire court was holding his sides with laughter.

49. "Well," said the lord finally,

12 50. "then I'll have to give two bags of gold,

51. one to the workman who carved so well,

52. and one to you who carved so cleverly.

53. I'll keep the wooden mouse,

54. and we'll let the cat have the other one.

Name:____________________ Date:____________________

Idea Unit Passage VI
Brown and Smiley (1977)

Ranking

1 1. Once there was a squire
2. who was very very wealthy.
2 3. He had everything he wanted
4. except a wife.
5. One day
6. the squire saw a young maid
7. working hard in the hayfield.
8. He liked her
clever of his three sons.
9. and was sure she would want to marry him at once
10. because he was so rich,
11. so he told her that he wanted her to be his wife.
12. "No thank you,
3 13. but that's not to my liking," she said
14. as she looked at his bald head.
15. But the squire was very stubborn,
16. so he sent for the maid's fatherour horse
17. and told him that if he could arrange this marriage
18. he would give the man much gold.
6 19. "Yes, you may be sure I'll bring my daughter to her senses," said the father.
20. "She is only a child,
21. and doesn't know wha's best for her."

22. But all his talking did not help

23. for his daughter was also very stubborn.

7 24. The father knew no other way to keep his promise to the squire

8 25. but to trick his daughter.

26. He would have the girl sent to the squire's farm

27. as though she were needed for some farm work.

28. When she arrived

29. a wedding would be waiting

30. and she and the squire would be married right away.

31. The squire thought this was well and good

32. so he prepared for a grand wedding

33. and then sent one of his farm lads to fetch what he had been promised.

34. So the lad ran off toward the farmer's house

35. and found the daughter raking hay in a nearby meadow.

9 36. "I am to fetch what your father has promised the squire," said the lad.

37. "So that is what they are up to," she thought to herself.

10 38. "I suppose he wants that little pony of ours," she said.

39. With this,

40. the boy jumped on the back of the pony

41. and rode home at full speed.

42. The boy soon arrived at the squire's house

11 43. where the women were waiting to dress the bride for the wedding.
44. The women fell into laughter
45. when they saw the pony.
46. They decided that the squire wanted to make his guests laugh
47. so they dressed the pony,
48. crown and all.
49. "Very well, bring her in!"
50. said the squire.
51. "I am ready."
52. There wa a terrible clatter in the hall,
53. for the bride, as you know, did not wear silken shoes.
54. When the door was opened
55. and the squire's bride entered
56. everyone laughed.
57. As for the squire,
58. he had enough of that bride,
59. and they say he never went courting again.

APPENDIX E
The Self Instructional Training Procedure

APPENDIX E

The Self Instructional Training Procedure

Self-Instructional Training Procedures (SIT)

Session 1

Using the assigned reading passage, the trainer introduces and models for the student the following steps.

Introduction:

"For the next three periods we will work together on imporving you understanding of what it is you read."

"From working with you over the last few weeks, I know we can make improvements."

"I'm going to show you a way so that you can do this yourself" -

"Here's the story I have to read."

First:

"I'll find out what it is I have to do; I can ask someone, read a question or simply decide I should figure out what this story is about. Any questions?"

Second:

"You should begin reading aloud but stop after the first paragraph. At the beginning of the first paragraph say out loud:"

'Let's see! I'm trying to find what this is about. So! I'll read the first paragraph. Most of the time people say what a story is about in the first paragraph.'

At the end of the first paragraph say 'OK! I've read the paragbraph. What was in here that told me about the story? What are the ideas in the story? What are the ideas in the story?'"

The instructor should pick out the details in the first paragraph. If there are too few, you should go on to the next paragraph. Explain this to the student by stating

"Somethimes one has to read further than the first paragraph to find out what the story is about. Any questions?"

Third:

"You should summarize what you think the story is about by stating

'OK! I've got some of the ideas from that paragraph -- seems this story is about....'

'I wonder what the main idea is -- Let's see; a main idea is a single sentence that captures the entire meaning of a story all at once. If I told someone that one sentence, then they'd know what the story was about. Now! I've got to remember that I may have to put together two or three of these ideas to get at the main one -- so I will read on just in case the last part is different from the first part of the story.'

"Any questions?"

Fourth:

Explain to the student and demonstrate what you are doing while continuing to read, stopping after each paragraph. Each time check the main idea in the paragraph and relate it back to the main idea in the preceding paragraphs. You should underline or write down the main idea in the margin rather than try to hold each one in your memory. Any questions?"

Fifth:

'OK! Here's the main ideas I've checked off in each paragraph.'
"Read these over,aloud."
'It seems that this story was about....' (draw together and summarize).

"Any questions?"

Sixth:

"Indicate that checking to see what you though was the main idea really is the main idea. This can be done by looking in the passage or checking with the teacher. Also, make sure one main ideas is stated."

Seventh:

Summarize the steps for the student. Then ask the student to go through the steps with you.

Step 1 - Question: What is it I have to do?
Step 2 - Read first paragraph.
Step 3 - Check to see what it was about.
Step 4 - Describe the main idea - underline or note in margin.
Step 5 - Read on, checking what is in each paragraph.
Step 6 - Underline the most important idea in the paragraph.
Step 7 - Read over each part that is underlined and make a summary looking for common ideas. This should be the most important idea.
Step 8 - Tell the teacher you are now able to describe what the story was about.
Step 9 - Check to see if you were right -- ask the teacher.

"Let's review them -- you say them out loud and I'll help." Then go on with "You know, these nine steps can be remembered by shortening them to six and using the key words.

- Question - What is it I have to do?
- Read - Begin by reading the first paragraph.
- Ideas - Look for the main ideas
- Describe - Describe the main idea or point or point in the paragraph by underlining
- Summarize - All the main points
- Check - See if you are right

"Any questions on these key steps? Please say them for me....Good!"
Work with student until he says all six, then say:
"A useful mnemonic or way of remembering these steps is:

Q RIDS failure or Quest, Read, look for main Ideas, Describe them, Summarize them, and check with the teacher to see if you are right. This verification or checking to see if you are right is what helps **RID** failure. Any questions? Do you see what I did? I took the first letter from all six steps and made up a saying, **"Q RIDS failure"**. Why? Because I check to see if I'm right. If I found that the answer was not the best, then I would go through the passage again."

"Now say these aloud with me once more...Now lets say them to ourselves just as if we were saying them aloud... Now say them to yourself." Explain how rereading, reading ahead and reviewing are all ways to check their work in addition to asking the teacher.

Eighth: Immediately following this discussion, have student do the assigned passage on his/her own. Remember if the student does not spontaneously cover the steps, then you should help him or her. Also please:

a. Ask the student to give you the steps;
b. Ask the student to do it aloud so that you can monitor his/her progress;
c. Provide feedback on the student's progress. Examples include:
 "Yes, good"
 "Not quite, what was the next step?"
 "Not quite, read on for more information"
 "Not quite, what else was said in this paragraph?"
 In rare cases you may need to assist the student in finding the most important idea. Use a hint first, then go to direct aid.
d. Ask the student to summarize what was learnt at the end of the session. Make supportive comments on progress.

This should be it for the training session.

Session 2

First:

Have the student give you the steps he/she learnt in Session 1. Feel free to provide help. Use the mnemonic to aid memory -- Q RIDS failure - how rid failure? By checking the answer.Ask the student to say to himself/ herself as saying them aloud, then ask him/her to say them aloud.

Second:

Have the student practise on the next assigned passage. Remember to have student give you the steps and to think aloud. Give fedback throughout the process and at the end.

Third:

Have the student do one other assigned passage on his/her own. Ask the student to do this one silently rather than aloud. However, continue to monitor the student's progress providing help where needed. Encourage questioning and help when the student is obviously stuck. Before starting ask the student to give you the steps. Remind the student to say the steps to himself/ herself as if he/she were saying them aloud.

This should be it for the second session. Draw together what was covered today, give positive but constructive feedback, discuss, ask for questions, have student give you the steps once more.

Session 3

Complete the assigned criterion test using criterion passage one. If the student fails to give you all the steps or obtains less than 80% on the criterion test, review the process as in Session 2. Then, give criterion passage 2.

If the student remembers all the steps and achieves 80% or more on the criterion passage, go through the procedure once more in a brief summary format and explain how this process can be used in any reading activity. Congratulate the student, ask if there are any questions and end the session. Follow the same procedure for any student who required criterion passage 2.

In the even that the student does not get the steps or achieve 80% accuracy on criterion passage 2, go to criterion passage 3. Accept that the steps may not be complete and try for 80% criterion on the third passage. In any event, close out the session as you would successfully completed criterion passage 1.

Some key strategies in SIT

- determining what I have to do - purpose
- read to see what the story is about
- summarize
- underlining, making notes
- read on
- try to find the main idea
- relationship of ideas in passage
- reviewing main ideas
- rereading
- summarizing
- verifying
- mnemonics

Some key techniques in SIT

- direct modelling
- instructor imposed
- fairly rote dialogue
- indirect teaching of strategies

APPENDIX F
The Learner Strategies Enabling Thinking Procedures

APPENDIX F

The Learner Strategies Enabling Thinking Procedures (LSET)

Session 1

Step 1:
Introduce the sessions by posing the question: "Why do you think we are workiing on reading?"

The object is to discuss with the student that he/she is helping me to develop a ways and means of understanding how people read.

But most importantly discuss with the student the instruction to help the student improve his or her reading.

Ask the student: "Do you think you can do better on reading?"

Discuss his/her answer, ask him/her to clarify reasons for his/her answer and explain that we have only three days to do this.

"While this is not going to be easy, it can be done. While some of the materials may look easy, I want you to get as much as possible out of them."

"On the surface, you can tell me what this is about. You're good! But, can you get all the details? Not too many people can. What are some reasons you think it is important to get all the details?"

Discuss this with the student to bring out the point that each paragraph has a main idea, sometimes these change from paragraph to paragraph, but a common idea will exist. Explain that it is important to get at the most important and common idea because it tells us what the story is about. This can be done in one sentence.

Ask the student: "How is learning to read and reread the story to get the main idea useful?"

Try to get the student to see that learning here will help resd the newpaper, a textbook, a story about hockey players -have the student generate examples.

Also, ask the student: "I said something in my question about reading -- a tip or strategy to help find the main idea. What was it?"

Try to get at rereading. Ask the student to define a strategy. Get at point that a strategy helps us do our work...it is a plan using different ways to help us check out if we are right, like rereading.

Step 2:

"Now that we've discussed what this is about and the reasons reading for the main idea is important, I would like for both of us to try a story."

Using the assigned passage give the story to the student and ask him/her: "What should we do first?"

The idea here is to have the student ensure that he/she knows what it is they have to do and why.

Encourage student to ask:"What should I do with this?", if the teacher doesn't tell him/her.

"OK, now you know why you're reading this story, what's next? Where would you start? What are some reasons for starting here?"

In the discussion try to get the student to explain why one should read the first paragraph because usually what a story is about is in the first paragraph.

Ask: "Is the main idea always in the first paragraph?"

Bring the student by use of an example to see that other paragraphs may contain the main idea of the story. - - - - Also point out other important ideas may come later. So we have to read on. Remind the student that it is good to be clear as to what the purpose for reading is. Have the student read aloud. At the end of each paragraph stop the student to pick out the main points. Explain what a main idea is if he/she seems unsure.

Once student gives main point or you help him choose one, say: "How did you find that? Why did you think it was important?"

It is important for the student to see how he/she found the main point and to recognize that he/she did it his/herself.

Step 3:

"OK! So for you and I have figured out what it is we had to do."

Ask why it is important that we know what we are to do. Then, ask the student to:

"Read the first paragraph and find out what it was about. Is this enough?"

Discuss the response. Ensure student understands it is not enough, that it is important to read on to confirm or deny what you think the story is about. Also, discuss whether the main idea is always in the first paragraph.

Ask: Can you think of some times when the author may not put the main idea of the story in the first paragraph?"

Get the idea across that the author may want to create an effect, a suspense, or just to throw the reader off.

Ask: "What should you do if this happens?"

Get across the idea that one should "read on".

"OK let's summarize: you tell me what step 1 was, step 2, step 3..."

Praise student for work

"Now, let's say I wanted to check if I was on the right track. How could I do this?"

Try to get the student to give a number of ways rather than asking the teacher. Also, try to get the student to use a summary to ensure no duplication or loss of any important points. Key strategies to elicit are rereading, underlining, summarizing, knowing the purpose for reading, looking for the main idea, reviewing, checking to see if what is thought to be correct is really in the passage - bring to point of reading on. Then have the student read on.

Step 4:

Stop the student periodically in each succeeding paragraph to review the process and the strategies.

Ask the student: "What should you do to help link all these ideas together? Is this important? What are some reasons for doing this?

Try to get at the relationship of the ideas, selecting the common ideas and reasons such as contributing to understanding what the story was about.

When all the story is complete, ask the student to summarize the story. After this is done, question the student about what he/she has said, point out any missing or erroneous parts by asking:

"How does your statement fit with the story? Do you think there may be another point? How can you check to see if you're right?"

Encourage students to be brief.

Step 5:

Ask the student to tell you what they learned. Ensure student tells you that they should
A. check to see what it is they have to do
B. read through the story
C. underline or note in margin the most important points
D. summarize all the points to get at the most important ones.
E. check to see if you are right.

Ensure that each student mentions some of the key strategies to do this by asking how they can check to see if they are right - include reading ahead, reviewing and rereading.

Session 2

Introduce this session with a review of the key points covered in Session 1, asking the student to give the key steps to you. Ask why it is important to review. Ask where he/she can use these steps to help in reading.

Ask the student what we are doing in reading -- try to get the student to generate the concept that to read is to think. Illustrate iwth planning a route to go to the university from L.Y. Cairns -- draw the analogy of a plan, a strategy as being a route map.

"Today I want you to do one. I'll be here to help, but I know you'll do an excellent job on your own. Do you agree or disagree? Pause, then go on with: Do it aloud so I can listen in; ask me any questions you like but try to think through what your reading just like you would with a route map. OK, here's the passage."

If the student does not ask you what to do in addition to reading, stop him/her and remind him/her to always clarify exactly what is required.

Ensure that the student stops and thiks at the end of each paragraph, underlines or notes important points, makes a summary and varifies what he/she has read. Check each main point to ensure it is appropriate. DO NOT give the student the correct one or cue him simply ask reasons why throughout the passage on items. that are correctly selected and those that are not. If the student does not spontaneously self correct, then suggest there may be a better answer.

"Please tell why I think there is a better answer and search for it."

A gradual increase in cueing so that the student is successful is acceptable.

At the end of the story ensure that the summary is made. Then have the student give you the key steps and how he/she applied those steps in the present story or in any story.

Discuss with the student whether he/she thinks this is helping and how it is or is not helping. As a final point, ensure the student is aware of how they have succeeded on their own.

Session 3

Complete the assigned criterion test using criterion passage one. If the student fails to give you all the steps or obtains less than 80% on the criterion test, review the process as in Session 2. Then, give criterion passage 2.

If the student remembers all the steps and achieves 80% or more on the criterion passage, go through the procedure once more in a brief summary format and explain how this process can be used in reading activity. Congratulate the student, ask if there are any questions and end the session. Follow the same procedure for any student who acquired criterion passage 2.

In the event that the student does not get the steps or achieves 80% accuracy on criterion passage 2, go to criterion passage 3. Accept that the steps may not be complete and try for 80% criterion on the third passage. In any event, cloze out the session as you would for a student who successfully completed criterion passage one.

Some key strategies in LSET:

- determining what I have to do - purpose
- read to see what the story is about
- read on
- rereading
- underlining, making notes
- summarizing
- verifying
- reviewing
- trying to find the main idea
- relationship of ideas in passage

Some key techniques in LSET

- no direct modelling
- student/instructor dialogue
- motivational set
- provides reasons for actions
- uses student verbalizations and expands them
- student/instructor created dialogue to make selected instructional points
- direct teaching of strategies
- introduction of new vocabulary (clarity of communication)

APPENDIX G
Directions for Administration

APPENDIX G

DIRECTIONS FOR ADMINISTRATION

Cloze Passages: Directions for Administration

1. PRESENT "PRE ALOUD PASSAGES:

   "I'M GOING TO GIVE YOU SOME SHEETS ON WHICH THERE IS A STORY WITH SOME OF THE WORDS MISSING. PLEASE READ THE STORY FILLING IN THE MISSING WORDS AS BEST AS YOU CAN. AFTER YOU HAVE FINISHED, PLEASE TELL ME, THEN I WILL TAKE BACK THE PAPER AND WE WILL TALK ABOUT THE STORY, SO TRY TO REMEMBER AS MUCH AS YOU CAN."

2. PRESENT THINK ALOUD DEMO AND PRACTICE.
3. PRESENT "ALOUD" PASSAGES".

   "NOW I'M GOING TO GIVE YOU SOME MORE SHEETS WITH STORIES. IN EACH STORY SOME OF THE WORDS ARE MISSING. PLEASE READ THE STORY FILLING IN THE MISSING WORDS AS BEST AS YOU CAN. THIS TIME, READ ALOUD AND THINK ALOUD. DO YOU KNOW WHAT I MEAN? (EXPLAIN ONCE MORE.) ALSO, TRY TO REMEMBER AS MUCH AS YOU CAN ABOUT THE STORY BECAUSE AFTER YOU HAVE FINISHED WE WILL TALK ABOUT THE STORY.

4. AFTER EACH ASK:
   a. WHAT DID YOU THINK THE STORY WAS ABOUT?
   b. PLEASE SUGGEST A TITLE FOR THE STORY.
   c. NAME THE IMPORTANT CHARACTERS.
   d. TELL ME WHAT YOU REMEMBER ABOUT THIS STORY.
5. SPECIFIC QUESTIONS TO BE ASKED AFTER EACH STORY FOR 3 CORRECT NOUNS, 3 CORRECT VERBS, 3 INCORRECT NOUNS, 3 INCORRECT VERBS.

   a. WHAT REASONS DO YOU HAVE FOR CHOOSING __________?
   b. WHAT GROUP OF WORDS INDICATE TO YOU THAT __________ SHOULD BE PLACED IN THE BLANK?
   c. WHEN YOU WORD IS IN THE PASSAGE/SENTENCE, WHAT DOES THE SENTENCE OR PASSAGE MEAN?
   d. HOW DOES YOUR WORD HELP THE MEANING OF THE PASSAGE?
   e. HOW DOES YOUR WORD HELP THE MEANING IN A DIFFERENT WAY?
   f. WHEN YOUR WORD IS IN THE SENTENCE, DOES THE SENTENCE/PASSAGE HAVE A DIFFERENT MEANING?

6. REMIND STUDENT TO THINK ALOUD.
7. INDICATE INTEREST AND QUESTIONING LOOKS THROUGH "HM!, AH!, HM?, AH?" AND ASK A FEW QUESTIONS TO KEEP STUDENT THINKING ALOUD, SUCH AS
   a. WHAT ARE YOU THINKING NOW?
   b. ARE YOU HAVING TROUBLE HERE?
   c. IS THIS A HARD ONE?
   d. YOU SEEM TO BE TAKING LONGER HERE, WHAT IS THE REASON?
   e. I NOTICE YOUR EYES MOVING -- ARE YOU LOOKING ANYWHERE SPECIAL?
8. AFTER EACH SET OF 3 STORIES, ASK
   a. WHAT WAS IT YOU HAD TO DO?
   b. WHAT REASONS DO YOU THINK I HAD FOR ASKING YOU TO DO A TEST LIKE THIS?
   c. WHAT DID YOU THINK OF THIS?

Protocol Analysis: Directions for Administration

1. PRESENT PASSAGE WITH DOTS SAYING:

   "I'M GOING TO GIVE YOU A STORY IN WHICH I HAVE PLACED A DOT AFTER JUST ABOUT EVERY SENTENCE. I WANT YOU TO READ THE STORY OUT LOUD. LET'S PRACTICE ON A SHORT ONE . . . "

2. AFTER PRACTICE (MODEL, IF NEEDED) TO GO ON.

   "NOW, I WANT YOU TO DO THIS ONE ON YOUR OWN. REMEMBER TO READ OUT LOUD AND THINK OUT LOUD WHEN YOU COME TO A DOT. ANY QUESTIONS?"

3. AFTER EACH PASSAGE ASK:
   - a. PLEASE TELL ME WHAT YOU THINK THE STORY WAS ABOUT.
   - b. PLEASE SUGGEST A TITLE FOR THE STORY.
   - c. NAME THE IMPORTANT CHARACTERS.
   - d. TELL ME WHAT YOU REMEMBER ABOUT THIS STORY.
4. AFTER EACH SET OF 3 PASSAGES ASK:
   - a. WHAT WAS IT YOU HAD TO DO?
   - b. WHAT REASONS DO YOU THINK I HAD FOR ASKING YOU TO DO A TASK LIKE THIS?
   - c. WHAT DID YOU THINK OF THIS?
5. REMIND STUDENT TO THINK ALOUD.
6. INDICATE INTEREST IN STUDENT COMMENTS THROUGH NON VERBAL CUES; USE OF "HM!, AH!," AND A FEW COMMENTS SUCH AS "THAT'S INTERESTING . . . TELL ME MORE!"

Scrambled Sentences: Directions for Administration

1. BEGIN WITH 3 UNITS -- IF THE PERSON COMPLETES 2 OR MORE SUCCESSFULLY, GO ON TO 5 UNITS. IF 2 OR MORE ARE

SUCCESSFULLY COMPLETED GO ON TO 7 UNITS.

2. INTRODUCE ACTIVITY AS FOLLOWS, LAYING OUT CARDS AS YOU SPEAK:

   "NOW I AM GOING TO GIVE YOU SOME CARDS. ON EACH CARD IS ONE SENTENCE. THE CARDS ARE IN A MIXED UP ORDER. IF YOU PUT THEM IN THE CORRECT ORDER, THE CARDS WILL TELL A STORY THAT MAKES SENSE. GO AHEAD AND PUT THEM IN THEIR CORRECT ORDER SO THAT THEY TELL A STORY THAT MAKES SENSE."

   FOR THE ALOUD SETS ADD:

   "REMEMBER TO THINK OUT LOUD AS YOU DO THIS. TELL ME WHEN YOU ARE FINISHED AND I WILL PICK THEM UP."

3. IF THE PERSON IS HAVING TROUBLE GIVE HELP ON THE FIRST ONE IN THE 3 UNIT CARDS. GIVE NO FURTHER HELP -- DO NOT SCORE THIS ONE AS 1 CORRECT.

4. AFTER ALL ARE FINISHED ASK:
   a. WHAT WAS IT YOU HAD TO DO?
   b. WHAT REASONS DO YOU THINK I HAD FOR ASKING YOU TO DO THIS?
   c. WHAT DID YOU THINK OF THIS?

5. REMEMBER TO PASS OUT THE CARDS IN THE 1-2-3 ORDER NUMBERING FROM THE STUDENT'S LEFT. PICK UP THE CARDS AND WRITE DOWN THE ORDER (A-B-C...) ON THE SCORE SHEET. BEGIN TIMING AS SOON AS THE CARDS ARE LAID DOWN AND THE DIRECTIONS ARE COMPLETED.

SCORE SHEET SCRAMBLED SENTENCES

Condition____________________

Student Name:____________________

Date:____________________

Set:____________________

Time to complete:____________________

Order:____________________

Comments:____

____

Set:____________________

Time to complete:____________________

Order:____________________

Comments:____

____

Set:____________________

Time to complete:____________________

Order:____________________

Comments:____

____

Set:____________________

Time to complete:____________________

Order:____________________

Comments:____

____

Questions:

4A____

____

4B____

____

4C____

____

Idea Units: Directions for Administration

1. PRE ALOUD

   "I AM GOING TO GIVE YOU A PASSAGE TO READ. AFTER YOU HAVE READ IT, I WANT YOU TO THINK ABOUT HOW YOU WOULD TELL A FRIEND THE STORY USING ONLY 12 OF THE MOST IMPORTANT LINES IN THE STORY. THAT IS, YOU HAVE TO CHECK THE 12 LINES YOU WOULD CHOOSE TO TELL YOUR FRIEND SO THAT YOUR FRIEND WOULD BE ABLE TO UNDERSTAND WHAT THIS STORY WAS ABOUT WITHOUT HAVING TO READ ALL THE STORY. REMEMBER, CHECK THE 12 MOST IMPORTANT LINES SO YOUR FRIEND WILL UNDERSTAND THIS STORY IN THE SAME WAY YOU DO WITHOUT HAVING TO READ ALL THE STORY."

2. ALOUD

   "NOW I AM GOING TO GIVE YOU A PASSAGE TO READ ALOUD. ALSO YOU MAY WANT TO THINK OUT LOUD WHILE YOU ARE READING THE STORY. AFTER YO HAVE READ THE STORY I WANT YOU . . . SAME AS PRE ALOUD . . . . REMEMBER TO THINK OUT LOUD SO I CAN LISTEN TO HOW YOU ARE THINKING WHILE YOU ARE THINKING OF THE 12 MOST IMPORTANT LINES."

3. AFTER EACH STORY ASK:

   a. WHAT DID YOU THINK THIS STORY WAS ABOUT?

   b. PLEASE SUGGEST A TITLE FOR THIS STORY.

   c. WHO ARE THE IMPORTANT CHARACTERS.

   d. TELL ME WHAT YOU REMEMBER ABOUT THIS STORY.

4. REMIND STUDENTS TO THINK ALOUD.
5. INDICATE INTEREST IN STUDENT COMMENTS THROUGH NON VERBAL CUES -- USE OF "HM!, AH!" AND USE OF COMMENTS SUCH AS "THAT'S INTERESTING, TELL ME MORE!"
6. AFTER EACH SET OF 3 STORIES, ASK:
    a. WHAT WAS IT YOU HAD TO DO.
    b. WHAT REASONS DO YOU THINK I HAD FOR ASKING YOU TO DO A TASK LIKE THIS?
    c. WHAT DID YOU THINK OF THIS?

GENERAL QUESTIONS AND OBJECTIVES OF STUDY

As per our discussions, please weave the following questions and objectives into your discussions with the student.

1. Do students predict how, what ... ?
2. Do students identify the problem?
3. Do students know (indeed do they select) a process/strategy prior to reading or when they encounter difficulty?
4. Do students check their solution with themselves or someone else?
5. Do students use whatever feedback they are given?
6. Do students plan their work?
7. How do students see selves relative to reading ability?
8. How do students see others relative to reading ability?
9. Do students provide statements about techniques that would aid in the retrieval of information?
10. Do students indicate whether they use any of the specific strategies such as: looking back, looking ahead, trying to remember, scanning the whole passage, rereading, asking anoter source, asking a question, and inferring...?
11. Do students indicate knowing they did or did not understand certain passages?
12. Do students indicate or report altering their strategy to increase comprehension?
13. Does this student engage in self-interrogation such as

    -why am I reading?
    -am I reading for detail or an overview?
    -do I know when I'm not comprehending?
    -when I don't, how do I get on track?
    -what are major/minor points?
    -can I summarize the major points?

14. Typically, did the student appear to

    -read for meaning?

-reread?
-be selective in reading?
-adjust reading speed?
-become easily distracted?
-read every word?
-check words?

15. On each type of reading exercise, determine whether students felt their eyes were moving faster than their mind could undestand the words.

APPENDIX H
Criterion Test and Passage One

APPENDIX H

Criterion Test and Passage One

Criterion Test

1. Ask the student to give you the steps in SIT. The student must know all the steps. Continue to train if the student does not know all the steps.

2. Ask for the steps in LSET. The student must give all of the steps. Continue to train if the student does not know all the steps.

3. Ask the following questions on criterion passage one:

   a. What was the pilot doing?

   b. What happened to cause the plane to dive?

   c. What happened when the pilot got out -- did he have some more troubles before he landed?

   d. Did the pilot have trouble getting out of the plane?

   e. How did the pilot get out?

   f. How high was the pilot?

   g. Suggest a title for the story.

   h. Why was the pilot afraid to pull his parachute?

Criterion Passage

Approximate reading level grade 5 (Fry)

It was a bright September afternoon in 1957 when I was testing the plane. I was ten miles up over Texas, testing a plane that was still top secret.It was to be a day that the U 2 and I would make history.

Since taking off 35 minutes before, I had been talking to the ground by radio reporting that all was going well. Now, still climbing, I saw mountains and a river far below.

Suddenly the plane began to dive yet there was no sound, no warning. I pulled the stick into my lap, trying to bring the nose back up, yet it kept heading down. A light on my panel showed me that the wing flaps were down! Why? I hadn't put them down!

"I'm in trouble," I shouted into my radio, "real trouble!"

I cut the engine and did everything I could to slow the plane, yet it was going straight down. Then it began to curl under in an outside loop.

Suddenly I yelled, "The tail has broken off!" At once the order came through my earphones, "Bail out!"

"I'm trying to!" I yelled back.

The early U-2's had no ejection seat to throw the pilot from the plane. It was up to me to get out as best I could. I pulled loose my oxygen tubes, and the radio and heat wires while yanking at my safety harness.

Now the plane was making wild loops. At the bottom of every loop, I fell out of my seat -- and each time my helmet smashed into the cockpit cover. On the fourth loop, the helmet smashed the cover open flinging me out into space.

I was falling, ten miles up where the air is too thin to breathe. I knew I had oxygen in my seat pack so I tried to find the valve, but couldn't. My eyes began to blur telling me that I was going to black out!

I could still see the ring for opening my parachute, but in this thin air should I pull it? I was falling very fast so the jerk when the chute opened might break my back. But I might be dead before I got low enough for the chute to open by itself. I quickly decided to reach for the ring and pulled it open.

There was no jerk, meaning that luck was still with me. Now I could find the oxygen valve easily. With the first breath of oxygen, I felt much better.

APPENDIX I
Rating Sample Sheet for Incidence of Strategies

APPENDIX I

Rating Sample Sheet for Incidence of Strategies

The following rating sheet was used for aloud pre and aloud post conditions.

Raters were instructed to indicate in the blank the number of times a particular strategy was observed. As well, raters were asked to indicate whether they observed the student as monitoring his performance and whether there was evidence for concrete or abstract thinking processes. While definitions were not provided to raters to use in their first review so as to avoid biasing perceptions, these definitions were available upon request. These defintions were not requested until post analysis discussions took place to resolve the small differences among rater perceptions.

DEFINITIONS FOR THE PURPOSES OF THIS STUDY INCLUDED:

RESTATEMENT:

repeating what had been read in in a slightly altered manner without changing the content or intent.

RECALL:

remembering a previously read word, sentence, paragraph or idea.

READING AHEAD:

reading forward word by word following a dot or blank.

REREAD:

returning to read over material previously read and reading all the material to the point where the student stopped.

LOOK BACK:

"looking back" to a specific point in a deliberate pre determined move to retrieve information.

SCANNING:

looking about the page in a general non directed search, may include scanning forward or backward.

MAIN IDEA:

use of the central idea, theme, or purpose of the passage.

SUMMARIZING:

making a summary of the material previously read.

INTERPRETATION:

commenting or expressing on what a word, sentence, passage or the story means - explaining in terms understandable to the student - goes beyond a simple repeating of what has been read.

ANALOGY:

describing a similiar situation that while different has similiar aspects.;;

HYPOTHESIZING:

making predictions, drawing inferences, making assumptions regarding the consequences of an action.

HYPOTHESIS VERIFICATION:

checking to see if the hypothesis is correct.

QUESTIONING SELF:

asking self questions as one reads.

QUESTIONING OTHERS:

asking the instructor a question.

PERSONAL EXPERIENCES:

referring to background knowledge, a personal incident or drawing a personal opinion based on experience.

LOGICAL SEQUENCE:

reference to a order of events in time or sequence based on commonly accepted practice of initiating event, action, and consequences.

SENSING THE MOOD:

identifying with or recognizing the feeling of a story.

VISUAL IMAGERY:

reporting on a mental picture of an incident, person or animal in the passage.

SOUND SYMBOL RELATIONSHIPS:

use of a phonetic cue or interpretation regarding the association of the printed symbol with the speech sound of the symbol - sounding out word to aid understanding.

SEMANTIC CUE:

clues derived from the meaning of the words, phrases and sentences surrounding an unknown word (Burns and Roe, 1980).

SYNTATIC CUE:

clues contained in the grammar of the language - use of words such as "her" typically being followed by a noun, "will" typically being followed by a verb and so on (Burns and Roe, 1980).

SONDS RIGHT, MAKES SENSE AND POPPED IN HEAD:

intuitive strategies stated by the student as an expression of the correctness of the item without being able to state another reason.

GUESSES:

simply taking a "guess" unrelated to any clue within or outside the passage.

Rater:____________________

Rating Sheet

Condition: Aloud Pre   Aloud Post

Student:____________________

Strategies	Introspective			Scrambled Sentences									Idea Units			Cloze Passages			Total
				3 Units			5 Units			7 Units									
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Restatement																			
Recall																			
Read Ahead																			
Reread																			
Look Back																			
Scanning																			
Main Idea																			
Summarizing																			
Interpretation																			
Analogy																			
Hypothesizing																			
Hy. Verification																			
Questions Self																			
Questions Others																			
Personal Exper.																			
Logical Sequence																			
Sensing the Mood																			
Visual Imagery																			
Sound/Symbol																			
Semantic Cue																			
Syntactic Cue																			
Sounds Right																			
Makes Sense																			
Popped In Head																			
Guessing																			
Monitoring																			
Abstract or Concrete																			
Recall																			
- text specific																			
- text entailed																			
- text detailed																			
- text external																			
No Response																			
Other																			
Total																			